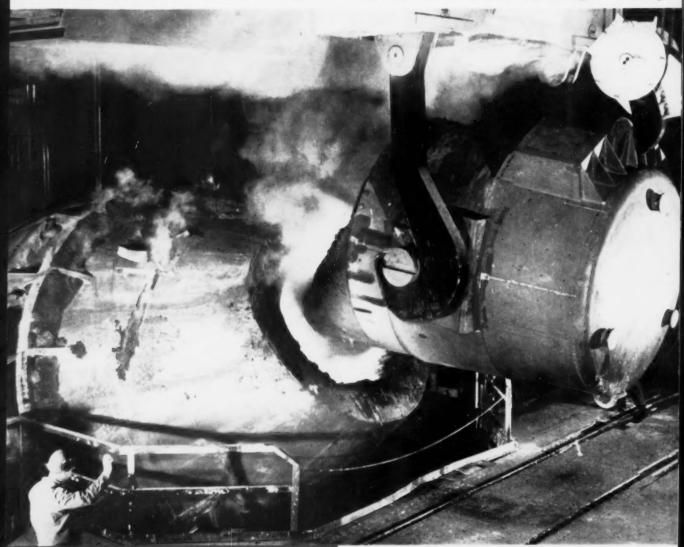
# The IRON AGE

February 6, 1958

A Chilton Publication

The National Metalworking Weekly



Oxygen Steel Breaks Million-Ton

Barrier P. 55

How to Work Aluminum-Coated Steel – P. 95

Buyers' Market For Electric Motors

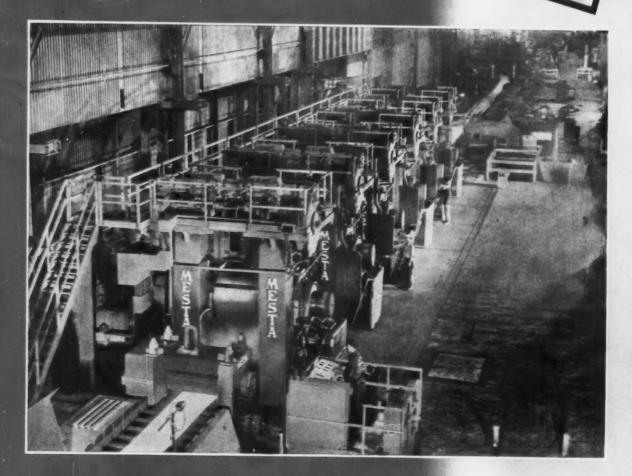
- P.140

Digest of the Week

P. 2-3

HOT STRIP MILLS

Designed and Built by
MESTA



MESTA 56" FOUR-HIGH HOT STRIP MILL FOR ROLLING STAINLESS,
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#### **Welding Steel Plates**

This elliptical head, shown here being fabricated from Bethlehem plates for Newport News Shipbuilding and Drydock Co., is a typical example of a welded structure in which the fabricator's prime responsibility is sound welds. Bethlehem plates are uniform in quality, so that with good welding technique, sound welds are assured. Bethlehem plates come in a full range of sheared or universal mill sizes. Write or phone the nearest Bethlehem sales office for complete information.

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February 6, 1958-Vol. 181, No. 6

### Digest of the Week in

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#### **NEWS ARTICLES**

#### ALUMINUM EXTRUSIONS

In Price Squeeze - Sharp competition in a soft market has touched off a round of drastic dis-



counting. While prices sag, costs are going up. Independents say they will go to Washington for P. 58 help.

#### PRODUCTION PREPLANNING

Benefits Missile Part Maker—A unique program of advance planning paid off for Fleetwings Div. of Kaiser Metal Products in its missile work. The study aided some of the P. 60 firm's suppliers.

#### **BUSINESS FORECAST**

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Upturn in Autumn - Cleveland banker-economist J. M. Dawson tells Industrial Heating Equipment Assn. that business will begin to pick up on about Labor Day. He's counting on increased consumer spending. P. 61

#### STEEL EARNINGS

Records for a Few in '57 -

### Metalworking



OXYGEN STEEL: Cover photo shows hot metal from blast furnaces being charged directly into a new basic oxygen furnace at Jones & Laughlin Steel Corp.'s Aliquippa Works. This week's Special Report documents progress of oxygen steelmaking in U. S. plants. P. 55

Despite a murky second half, some steel firms made new earnings records last year. Leaders see current downturn leveling off. P. 63

#### METAL CUTTING

Research Program Due?—Major study of better ways to machine the new superalloys is recommended by many machining experts. Some suggest a massive crash program.

P. 81

#### FEATURE ARTICLES

#### ALUMINUM-COATED STEEL

How to Work—Sheet steel coated with aluminum takes the punishment of outdoor service. But it's vital to protect the durable qualities during fabrication. The answer is in a few simple rules, mostly governed by the aluminum coating. Standard equipment does the job with a few changes in techniques.

P. 95

#### VIBRATION DETECTORS

Cure Machining IIIs — Unsuspected vibrations in machine tools can cause losses in tool life and poor quality of workpiece surfaces. It takes electronic detection and measuring devices to solve such vibration problems. One type of detector uses an induced-voltage transducer.

P. 98

#### BOOST BRAZING RATE

With Dual Fixturing—Induction brazing machines only work half the time if they have to wait for loading of fixtures. On one brazing line, dual fixturing enabled a plant to double brazing rate. P. 100

#### CORRUGATED STEEL FOIL

Strength in Lightness — A way seems to have been found to cut weight in supersonic aircraft by 25 pct, or without adding any weight to make them withstand aerodynamic heating up to 750°F. It's done by putting miniature corrugations in thin sheets of stainless steel such as 17-7PH alloy. P. 102

#### LIQUID HONING

Speeds Precision Finishing — A new liquid honing machine cleans 320 titanium jet engine blades per hour without disturbing metal. The biggest innovations come in automatic handling of blades. P. 108

#### MARKETS & PRICES

#### PLASTICS ADVANCE

More Used in Autos—In the past 14 years, use of plastics in automobiles has increased 400 pct. Many possible applications still remain to be worked out, including the area of tooling.

P. 72

#### PURCHASING OUTLOOK

For 2nd Quarter—A sampling of purchasing agent opinions in the East and Midwest indicate that industrial buying next spring will hold at current levels. P. 64

#### MISSILE CONTRACTING

Picks Up Speed — New missile orders for West Coast firms are stirring up plenty of activity. Metalworking subcontractors share in it. Production boosts on the Atlas and the Bomarc will be coming soon.

P. 79

#### STEEL PICKUP?

The Signs Are Faint—Some steel men say there are signs of a pickup in their business. It's not anything to get excited about for the immediate future.

P. 139

#### ELECTRIC MOTORS

The Buyer Is King — Sales of fractional, integral, and large horse-power motors are all lagging. Builders court buyers with offers of rapid shipment, competitive prices, and improved product designs.

P. 140

#### NEXT WEEK

#### FERROUS CASTINGS

Get Your Money's Worth — If you are in any way concerned with castings, you'll want to read next week's feature, latest in the Metalworking Dollar series. It will show the ins and outs of designing, buying, and processing castings.





# METRIE

Big Capacity to Meet Big Demand

CHICAGO

Serving Industry Since 1883

1,630,000 net tons of merchant pig iron—including silvery pig! That's the yearly capacity of the seven blast furnaces at Chicago, Duluth, Erie, Toledo and Jackson, Ohio, producing Meltrite and Globe Silvery.

If this amount of pig iron were loaded into railroad cars of 50 tons capacity each, the train would extend from Chicago to Cleveland!

Strictly merchant, Meltrite is always in dependable supply, the entire production is for sale at all times. More Meltrite is used than any other merchant pig iron. There's a reason.

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# CAM LIMIT SWITCH ADJUSTABLE IN MOTION

#### GREATER SAFETY! GREATER FLEXIBILITY! GREATER PRECISION! EASIER MAINTENANCE!

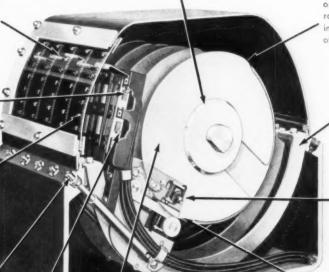
PRECISION—Cams can be loosened and reset without removing them from shaft. Graduations facilitate making precise settings.

PRECISION – Graduated scales for adjustment of each switch unit are printed on inside of clear plastic window. Provision is made for circuit identification visible through window.

FLEXIBILITY—An additional isolated contact—easily convertible in the field—is available for each switch unit, to permit control of two circuits from a single unit.

MAINTENANCE—All contacts clearly visible through plastic window. Inspection may be made without removing switch cover.

PRECISION — Position of switch unit can be adjusted to micro-accuracy over a 30 range from outside housing while machine is in motion.



SAFETY—Switch unit is actuated only when roller is riding on raised segment of cam. Jogging in reverse does not alter sequence of operations.

FLEXIBILITY—Rearmounted switch units can be added to permit micro-adjustment of both make and break of a single circuit operated by a single cam.

PRECISION—Snap-action, latching type switch units make possible smooth performance, being operated by constant acceleration cams eliminating "bumping".

**SAFETY**—Cams force contacts open and hold them open—assuring postive break.

#### SAFETY

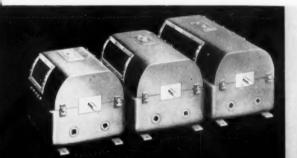
Heavy-duty 15 ampere industrial-control type contacts will not jaropen with severe vibration.

#### PRECISION

Large (7-in.) twin-disc adjustable butterfly cams operate each circuit. Wide variety of cam equipment available to cover range of contact, operations from 15° to 345°. with cast aluminum base and welded steel cover meets NEMA 4 (watertight) and NEMA 12 (automotive and J.I.C.) standards. Oil resistant rubber gasketing and packing under pressure completely seal enclosure.

3 basic sizes: 5 cam, 9 cam and 12 cam. The 12-cam size can be modified to accommodate up to 16 cams. With double-sided switch arrangements, each size can provide additional switch units up to one less than the number of cams.

These new Clark Type "AL" Cam Limit Switches meet the rugged requirements of large presses, and have broad application on many other machines where accurate and dependable sequence operation of multiple circuits is required. They are ideal for use where it is advantageous to make precision adjustments while machines are in motion, and are particularly suitable for many applications in the field of Automation.



For more information, write for Bulletin 102-AL



IN CANADAI CANADIAN CONTROLLERS, LIMITED . MAIN OFFICES AND PLANT, TORONTO

### Salt bath heat treating helps put you in a better competitive situation!

The Ajax files are full of case history records such as these. Each represents a typical instance where replacement of other heat treating systems with Ajax Salt Baths have meant important cost reductions or greatly improved quality-and usually both:

\$37,000 WAS SAVED in 8-months by an Ohio manufacturer through using an Ajax Electric Salt Bath installation for 4 different cost-cutting operations i.e. carburizing, simultaneous carburizing and brazing; brazing; and hardening.

A 350 % PRODUCTION INCREASE in 45% less space with 50% less labor was achieved in carburizing bearing races in a 6-unit Ajax Electric Salt Bath installation.

A 60% COST REDUCTION in case hardening body screws was scored by a single Ajax Salt Bath no larger than your desk but handling 390 lbs. of work per hour.

AN 80% REDUCTION in finish grinding time was obtained by martempering SAE-52100 bearing races in an Ajax installation. Drawn to Rc 62-63, the races showed average out-of-round distortion of only 0.002-0.003".

A 4 TO 5 TIME LIFE INCREASE for rock bits resulted from Ajax Salt Bath hardening which also made possible use of plain carbon rather than costly alloy steel. 480 lbs. of work per hour are handled in a bath only 36" x 11" x 36".

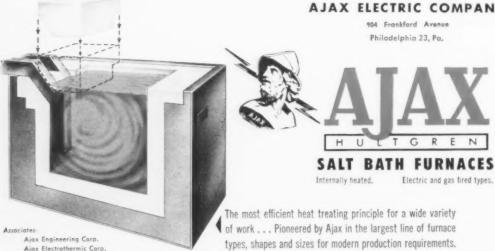
SIMULTANEOUS CARBURIZING AND BRAZING of a complicated motor starting assembly are done in one Ajax furnace with one heating of the work as compared to two heatings previously required.

Savings like these are vitally important—and Ajax can help you to realize them to the fullest extent.

The chief product of Ajax is applied heat treating "know how" . . . not merely the largest assortment of salt bath furnace types in the world. When you discuss heat treating matters with Ajax, you get full benefit of unmatched experience not alone in designing and selling furnaces, but in helping you utilize them to best possible advantage.

There is no obligation in having Ajax make a frank appraisal of your heat treating situation.





DIONEERS IN SALT BATH HEAT TREATING PROGRESS

## The Confidence Boom: It Should Start Real Soon

At the risk of seeming a little corny, let's remind ourselves that it is always the darkest before dawn.

For some months business confidence has taken a terrible beating. The doom-gloom boys have been having a heyday. They have caused some people to see that "hair curling depression" just around the corner.

This brings up an important question: What does confidence have to do with the business outlook? During most of the time confidence plays a small auxiliary part in the overall picture. There are more potent factors than confidence—or lack of it—which tug at the economic threads.

There comes a time, though, when lack of confidence accentuates or aggravates recession conditions which have been brought on already by other factors. This seems to be the case now. Some managements with perfectly good reasons to buy materials, to increase budgets, and to look to the future with strength, are moaning the blues. More people take it up and it becomes a vicious circle.

Sometime within the next few months it will sink into many minds what the defense program means. Some of us will stop our wailing long enough to see the increase in housing starts, the step-up in road building, the rehiring and better tone in aircraft plants and the dangerously low level of metal and other stocks in the hands of manufacturers.

There is no "in-between" in this period just ahead. Either we will come up sharply from the quick and rugged drop of the past several months or we go down even further to a 1929 type of bust. We certainly doubt that the present trend is toward the latter.

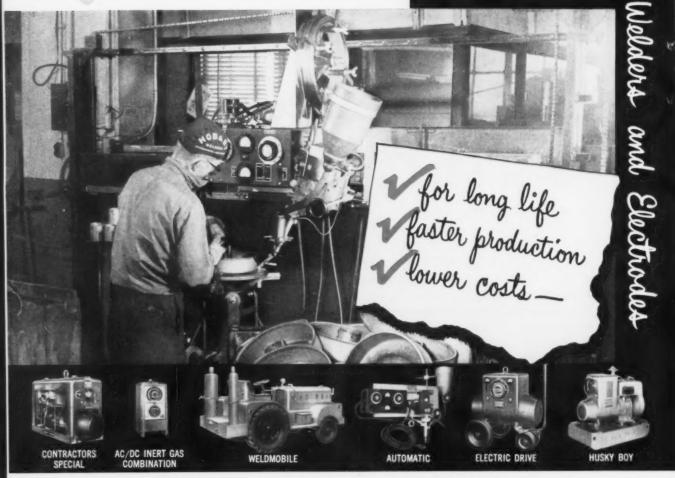
Within a few months most of us will be partially cured of our gloomitis and come to our long-term senses. When that time comes we will find that while we were blundering in a statistical slumberland, business had quietly bottomed out of its slump. Then will come a new burst of confidence that will cause many to wonder why they were so down-in-the-mouth in January.

Just as lack of confidence is not the primary cause of a downturn, so a burst of confidence will not cause an upturn. But its resurgence will take out of the picture a negative factor that under most circumstances makes business look much worse than it really is.

Then we will breathe easier industrially!

Tom Campbell

# Check the New HOBART



#### ...any type welder...all built by HOBART

Hobart manufactures the world's most complete line of arc welding equipment. Back of that statement you'll find these facts. Each model is completely built in Hobart's plants. Each step of the manufacturing process is the result of years of constant research and experience. Hobart welders contain more top quality features than any other. These tested and proven features are "built-in" at the

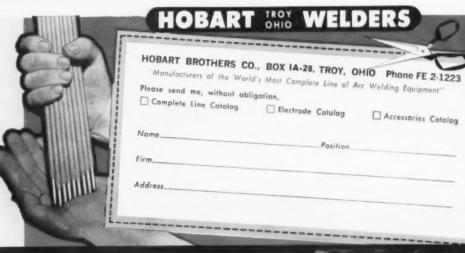
factory—assuring longer life, faster production and lower costs. Hobart manufactures a welder to fit the varied needs of the welding world, from the small shop to our mightiest industries. We'll be glad to show you how much Hobart welders will help you.

Without obligation, just ask for our latest catalog. Please use the coupon below.

#### The BEST ELECTRODES in the world!

Faster, less spatterused by leading industries everywhere!

. . . like their welders, Hobart
electrodes are completely manufactured by Hobart . . . from
the mining of RUTILE in their
Florida mines, to their ultra
modern Troy finishing plant.
Comparison will prove
Hobart's superiority.



#### LETTERS FROM READERS

#### For Top People

Sir — We feel that the article entitled "Are We Heading Into A Prosperous Recession" is excellent. We would like to place copies in the hands of our Top Management Committees and wonder if you could furnish these.—J. L. Hallman, Mgr., Commercial Research & Promotion, Alan Wood Steel Co., Conshohocken, Pa.

Copies are being sent.-Ed.

#### **Best Ever**

Sir — Congratulations on your editorial "Keep Your Head Screwed On You Cannot Afford to Lose It." It is the best I have ever read anytime, anywhere.—J. S. Marsh, Ad Mgr., Refractories Div., H. K. Porter Co., Inc.

Sir—I read your editorial "Every New Year Is Tough Don't Let This One Throw You." It is indeed interesting and timely.

I would like permission to reprint this in our house organ, The Megaphone, which goes to 10,000 electric motor repair shops throughout the country.—G. D. Mayfield, Ad. Mgr., Insulation and Wires, Inc., St. Paul.

**Sir**—May we reprint in full, your editorial of January 2, in our internal house organ, The McKay Diamond?

Our executive personnel has remarked that this might be an excellent thought for all of us.—
R. C. Wallis, Ad. Dept., The McKay Machine Co., Youngstown, Ohio

Permission granted.-Ed.

#### Likes Annual

Sir—Congratulations on a very fine 103rd annual issue. I believe your Special Survey Report covering seventeen industries is most helpful and I would appreciate receiving an extra copy. It will be very useful in planning the year ahead.—R. G. Ullman, Vice Pres., Sales, The West Steel Casting Co., Cleveland.

Sir—I have just finished reading "The Next Decade: Can Business Gain 40 Pct?" which appeared in your annual issue and found it interesting as well as informing.—P. H. Brotzman, Firestone Tire & Rubber Co., Akron.

#### Reprint for Courses

**Sir**—We have read with interest the articles "You Can Cut Cost Through Tight Inventory Control" (Sept. 12, 1957) and "How To Cut Inventory Guess Work" (May 9, 1957).

As the distributors of our product are systems consultants, we feel the data in these articles should be passed along to them. But we also conduct four or five schools each year for new systems consultants, and recognize that this information would be valuable in assisting them to understand the importance of proper inventory control.

Would you please give us permission to reprint the pertinent facts for use now and for future schools?

Congratulations on the excellency of these articles.—C. C. Raber, Sales Mgr., VISIrecord, Inc., Copiague, N. Y.



"I'm willing to travel."

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#### FATIGUE CRACKS

#### **Good Casting**

We hope you'll remember to cast your eyes on next week's Metalworking Dollar series feature. As you may have guessed, it'll be on ferrous castings.

As the title suggests, this will be a money-saving piece loaded with down-to-earth ideas for the fellows who design, specify, buy and use the foundry's product.

How many bucks is it worth to you? That depends on how much of the \$4 billion spent for castings each year comes out of your pocket. But its a safe bet that unless you have every facet of the castings business at your fingertips, you're bound to get enough plain facts and tips from it to slice a sizable chunk from your budget for castings.

Suppose you're getting good value, dollar-wise, from your castings. You can still benefit from the tips on design, or perhaps on machining, heat treating or welding of castings so that you wind up with a better product.

Is No. 13 of the Metalworking series for castings users alone? Not at all. There are just as many pointers for non-users—the fellows who haven't been converted. The facts will be there for both groups, So look for them.

#### **Dream Contest**

Contest judges who have become bleary-eyed from counting box tops and trying to decipher the scrawls on entry blanks from tots and tycoons alike have finally come across the dream contest. It's a slogan contest where every one of the thousands of entries from all 48 states was either typewritten or lettered as carefully as on the designs for a \$5 million space vehicle.

Why So?—Here's the catch. The contest was sponsored by the engi-

neering firm of Keuffel & Esser Co. as part of its 90th anniversary celebration. It was aimed at engineers, architects, and draftsmen who might use the company's permanently transparentized Albanene tracing paper and to whom clarity is an absolute requirement.

First prize of \$1,500 has been awarded to F. R. MacMillan, Philadelphia. A total of 90 neatly made out checks were awarded to winners in 82 cities in 36 states and the District of Columbia.

#### New Puzzler

A boy was running away with a watermelon that he had stolen from a farmer's melon patch. He had gotten over a stone wall and was crossing a pond that was frozen over, when the farmer came out, took aim, and shot the boy, who dropped to the ice and went through. When he was fished out, he was dead. It could not be ascertained whether his death was caused by drowning or by the bullet. Could the farmer be convicted of murder?

This is strictly for our legalminded readers, if any, and this puzzler is off limits for the GSCC Gang.



"I work time-and-half for money my wife spends double-time!"



#### **Red Circle Rolls**

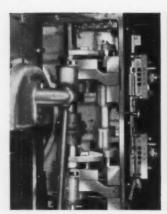
#### for all purposes

The Red Circle on the Roll is the Hyde Park mark of Quality. Hyde Park makes rolls for every type mill

CHILLED ROLLS - ALLOY IRON ROLLS - MOLY ROLLS - NICKEL CHILLED ROLLS - GRAIN ROLLS - COLD ROLLS - SAND ROLLS

for Finer Finish, Longer Life and Greater Tonnage specify Red Circle







Provide Radial Screw Adjustment of Forming **Tool Slides** 

Models 25/8" LA, 31/2" AD, 5" KL, and 51/4" KR Conomatic Four Spindle Bar Machines are equipped with a number of quick job-change features. One of these is the all-position end attachment drive for the mounting of endworking opposed spindles in all positions, with independent feed to as many as three opposed spindles on a single setup.

Another feature that is of considerable importance in tooling up is the radial screw adjustment of all sideworking slides. Trial cuts may be taken to correct diameters with form tools without changing the clamped positions of the form tool holders.

All Conomatic quick changeover models are equipped with dial adjustment of the working stroke of all tool carrying slides. Besides the Four Spindle machines there are three quick change Six Spindle models in %16", 1" and 15%" sizes. Write, wire, or phone for literature.



## Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U S.A.

#### EXHIBITS, MEETINGS

Packaging Machinery and Materials Show—March 25-28, Convention Hall, Atlantic City, N. J. (Hanson & Shea, Inc., One Gateway Center, Pittsburgh 22.)

#### **FEBRUARY**

Malleable Founders Society—Technical and operating conference, Feb. 6-7, Wade Park Manor, Cleveland. Society headquarters, 1800 Union Commerce Bldg., Cleveland.

American Society for Quality Control—Annual conference on management by exception, Feb. 7-8, Carter Hotel, Cleveland, Information: B. F. Goodrich Chemical Co., 3135 Euclid Ave., Cleveland.

Non-Ferrous Founders' Society— West Coast management & operating conference, Feb. 7-8, Ambassador Hotel, Los Angeles. Society headquarters, 1604 Chicago Ave., Evanston, Ill.

Institute of Surplus Dealers—Annual trade show and convention. Feb. 14-17, New York Trade Show Bldg., New York, Society head-quarters, 673 Broadway, New York 12.

American Institute of Mining, Metallurgical & Petroleum Engineers— Annual meeting, Feb. 16-20, Hotels Statler and Sheraton-McAlpin, New York. Society headquarters, 29 W. 39th St., New York.

Assn. of Iron & Steel Engineers—Western meeting, Feb. 24-26, Hotel Statler, Los Angeles. Society head-quarters, 1010 Empire Bldg., Pittsburgh.

#### MARCH

1

Can Manufacturers Institute, Inc.—Annual meeting, Mar. 3, Waldorf-Astoria Hotel, New York. Society headquarters, 1413 K St., N. W., Washington.

(Continued on P. 16)

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#### Cuts Welding Costs! Speeds Production!

#### GETS EVERYWHERE!

Hard-to-weld Metals Now Welded Automatically! There is now a portable hand gunfor gas-shielded welding of aluminum, mild and stainless steels, bronze, copper and magnesium! Moreover, this hand gun has its own self-contained wire supply!

It is named the WEST-ING-GUN. It works with any standard DC welding machine. It has averaged horizontal fillets of 22 inches-perminute-with 1/16" wire! Throughout extensive field tests, this WEST-ING-GUN has doubled men's daily output!

#### OPERATOR FATIGUE "ELIMINATED"!

This WEST-ING-GUN "handles" as easily as pointing your finger, to weld in any positionregardless of cramped quarters! Its portability between gun and control-between control and power-source-provides complete working freedom and ease-up scaffolding-atop laddersall around any type of workpiece. This gun weighs only four pounds-including its full, pound reel of wire! Operators working a steady 30% duty cycle, with WEST-ING-GUNS, say they "feel no fatigue at all"!



**Welding Remote from Power Source!** 

20-lb control is readily carried up superstructures! Every shipyard visited, during field-tests, immediately ordered WEST-ING-GUNS!



Time Saved in Tight Quarters!

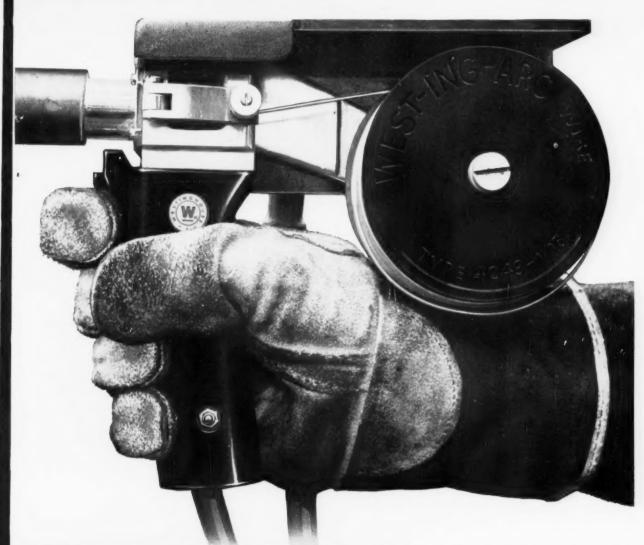
Weld wherever you please! Power and shielding gas are in a single-hose assembly. This permits access to heretofore "impossible" locations!



New Welding Speed on Big Units!

You can take the gun wherever you want to weld! The control stays with the machine! One man can now do the work that used to require two!

Watch Westinghouse for New Developments





Maintenance Welding Simplified!

WEST-ING-GUNS and lightweight control units do the job quickly! Invaluable as a time- and cost-saving production tool!

in Welding



Aircraft Quality Welds Every Time!

Difficult welds are readily completed with new ease—in production of aircraft equipment—often well backintonormally inaccessible areas! A unique, gear-head replaceable mechanism in the handle drives \( \frac{1}{16}'' \) wire up to 350'' per minute (finer wire twice as fast)! Wire is "inched" at the touch of a button. The short, 6'' travel eliminates wire-feeding problems!

There are WEST-ING-GUNS and the controls available—for any DC welders. The compact, rugged control-unit for each model weighs less than 20 pounds. Virtually every welding shop has countless applications where WEST-ING-GUNS will save appreciable amounts of money!

Avail yourself of the opportunity to see what this new production tool can do for you! Contact your nearest franchised Westinghouse Welding Distributor; or write to the Westinghouse Welding Laboratories, Box 2025-A, Buffalo 25, New York.

J-22100

#### SHEPARD NILES

# Large Industrial Cranes 1 to 450 TONS



FOR OVER 50 YEARS, Shepard Niles has been a distinguished name in cranes. A pioneer in the overhead crane industry, Shepard has never failed to modernize and progress through the years. Today its cranes serve thousands of satisfied users, plus an ever-increasing number of new customers.

Shepard offers a complete line of heavy industrial cranes . . . from I to 450 tons . . . for light, medium or heavy service. Available for constant or intermittent duty in slow, medium and high speeds; operated from cab or floor. Let a Shepard Niles representative help you select the crane that best fits your plant's load-handling requirements.



1484 Schuyler Ave., Montour Falls, N.Y.

#### EXHIBITS, MEETINGS

(Continued from P. 13)

American Machine Tool Distributors' Assn.—Spring meeting, March 10-11, The Roosevelt, New Orleans, La. Society headquarters, 1900 Arch St., Philadelphia 3.

National Assn. of Waste Material Dealers, Inc.—Annual convention, Mar. 15-18, Waldorf-Astoria, New York City, Society headquarters, 271 Madison Ave., New York.

Steel Founders' Society of America
—Annual meeting, Mar. 17-18,
Drake Hotel, Chicago. Society
headquarters, 606 Terminal Tower,
Cleveland 13.

National Assn. of Corrosion Engineers—Annual conference and exhibition, Mar. 17-21, Civic Auditorium, San Francisco. Society headquarters, 1061 M&M Bldg., Houston.

International Acetylene Assn.—Annual spring convention, Mar. 19-21, The Bellevue-Stratford Hotel, Philadelphia. Society headquarters, 205 E. 42nd St., New York.

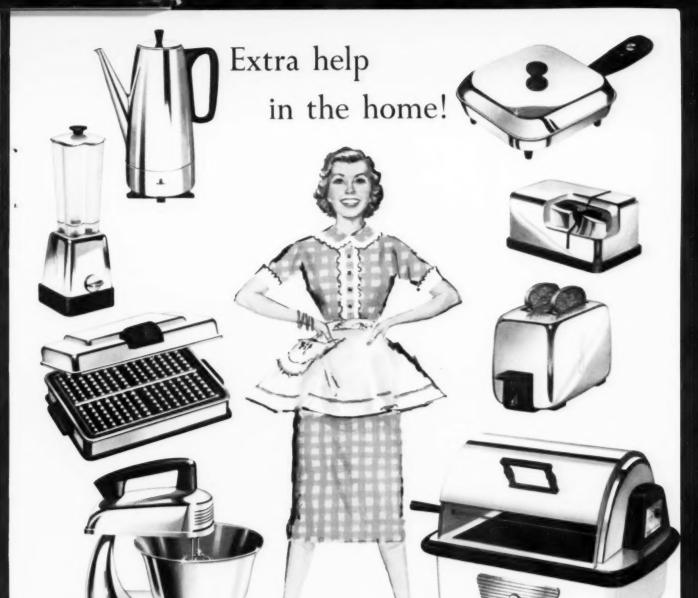
American Hot Dip Galvanizers Assn., Inc.—Annual meeting, Mar, 27-28, Penn Sheraton Hotel, Pittsburgh. Society headquarters, 1806 First National Bank Bldg., Pittsburgh.

#### APRIL

Concrete Reinforcing Steel Institute
—Annual meeting, Apr. 6-12, The
Boca Raton Hotel, Boca Raton,
Fla. Society headquarters, 39 S.
Dearborn St., Chicago.

Wire Reinforcement Institute, Inc.
—Annual spring meeting, Apr. 7-8,
Hotel Boca Raton, Boca Raton,
Fla. Society headquarters, National
Press Bldg., Washington.

Industrial Fasteners Institute—Annual meeting, Apr. 8-10, Boca Raton Hotel, Boca Raton, Fla. Society headquarters, 1517 Terminal Tower, Cleveland.



best sellers with

Superior

STAINLESS STRIP STEEL

Powered appliances for the homemaker lend willing help on many tasks—from sharpening knives to broiling chickens. And solid, ever-lustrous Superior Stainless lightens care for the life of each unit: a wipe, and it's bright! Superior Stainless Strip Steel is preferred by appliance manufacturers for dimensional accuracy; precisely as-specified composition, temper and finish; uniform ease of fabrication. • Let us have your requirements.

#### Superior Steel

DIVISION OF

COPPERWELD STEEL COMPANY

CARNEGIE, PENNSYLVANIA

For Exports Copperweld Steel International Company, New York

# AIRCO ANNOUNCES THE FASTEST ELECTRODE ON THE MARKET

# AIRCO EASYARC. 30

This new mild steel electrode—the latest addition to Airco's complete line of electrodes—deposits 17 pounds of metal per hour at 100% work factor—six pounds faster per hour than yester—day's best. The extra-heavy iron powder covering permits high machine settings (450 amps AC) for high welding speeds.

Easyarc 30 is designed for making positioned fillets or butt welds. Steady spray-type transfer, easy slag removal. The unusually high deposition rate, together with outstanding X-ray and mechanical properties, makes Easyarc 30 an ideal electrode for high speed welding of pressure vessels, machine bases and structural weldments. Available in ½" diameter, standard 18" length. Contact your nearest Airco office, or write to address below for complete information and free samples.

B DEPOSI

DEPOSITS

17 LBS.\*

PER HOUR ...

6 LBS. MORE

than any other electrode \*At 100% work factor

AT THE FRONTIERS OF PROGRESS YOU'LL FIND . .





#### AIR REDUCTION SALES COMPANY

A division of Air Reduction Company, Incorporated 150 East 42nd Street, New York 17, N. Y. On the west coast Air Reduction Pacific Company Internationally Airco Company International

In Cuba — Cuban Air Products Corporation

In Canada — Air Reduction Canada Limited

Products of the divisions of Air Reduction Company, Incorporated, include: AIRCO — industrial gases, welding and cutting equipment, and acetylenic chemicals • PURECO — carbon dioxide — gaseous, liquid, solid ("DRY-ICE") • OHIO — medical gases and hospital equipment • NATIONAL CARBIDE — pipeline acetylene and calcium carbide • COLTON — polyvinyl acetate, alcohols, and other synthetic resins.



Claymont's 160-inch plate mill in action. Fully integrated steel producing facilities and a complete range of fabricating equipment make Claymont a reliable source of quality steel plate and plate products for industry.

Photo by d'Arazien

## CLAYMONT STEEL PLATES



CHECK CLAYMONT FOR—Alloy Steel Plates • Carbon Steel Plates • Stainless-Clad Steel Plates
High Strength Low Alloy Steel Plates • CF&I Lectro-Clad Nickel Plated Steel Plates • Pressed
and Spun Steel Heads • Manhole Fittings and Covers • Fabricated Steel Products
Large Diameter Welded Steel Pipe

PRODUCTS OF WICKWIRE SPENCER STEEL DIVISION • THE COLORADO FUEL AND IRON CORPORATION

Plant at Claymont, Delaware • Sales Offices in all Key Cities

## Announcing A New IRD system to Reduce Costs On Machinery Maintenance And Quality Control

Bearing failure, fatigue, chatter, vibration, wear, noise eliminated with new multi-purpose IRD system, like this —



CHECKING — Machinery such as this jig borer can be inspected with the new IRD Model 305 Portable Vibration Meter for an acceptable or excessive vibration level — the key to its efficient operating condition. Once the portable [24-oz. weight] Model 305 establishes the presence of vibration...



TROUBLESHOOTING is continued with a Vibration Analyzer and partable balancer such as the Model 400 above. Cause of machinery vibration — unbalance, misalignment, bearings, belts, etc.—is pinpointed and correction is made on the spot—without costly trial and error dismantling of machinery. When vibration is caused by unbalance, the analyzer is used for . . .



IN-PLACE BALANCING — without costly dismontling, onywhere in your plant. The analyzer presents the location and amount of correction required on the faulty part as it rotates in so wan bearings at operating speed. When it is required to balance disassembled components . . .



DYNAMIC BALANCING is performed as pictured with the multi-purpose IRD Model 102. Any one of 12 models of IRD Vibration Analyzers can be used with the Models 101, 102 and 103 Balancing Systems, depending on application involved. Vibration Analyzer, or electronic brain of the Balancing System is easily detached for both troubleshooting and in-place balancing.

No matter what your product or process, wherever a wheel turns — you can obtain a cost-saving dimension of production efficiency and product quality you may now think impossible.

Write today for new bulletin 102 — or if you prefer we'll gladly have a sales engineer give an in-your-plant demonstration of the IRD system.

IRD system

International Research & Development Corp. 801 Thomas Lane, Columbus, Ohio



As a division of Sharon Steel, Brainard's integrated production insures a constant supply of high quality, heavy duty and tensional strapping in all standard sizes and gauges.

Brainard's Steel Strapping is more than a product, it is a system of specifically designed tools and accessories for the most modern of packaging and material handling. Brainard's Strapping service is available throughout the United States and Canada.

#### Brainard Steel Strapping

Brainard Steel Division, Sharon Steel Corporation Larchmont Avenue, Warren, Ohio BRAINARD STEEL STRAPPING DIVISION WARREN OHIO

Please send me more information about BRAINARD Steel Strapping.

NAME\_

COMPANY

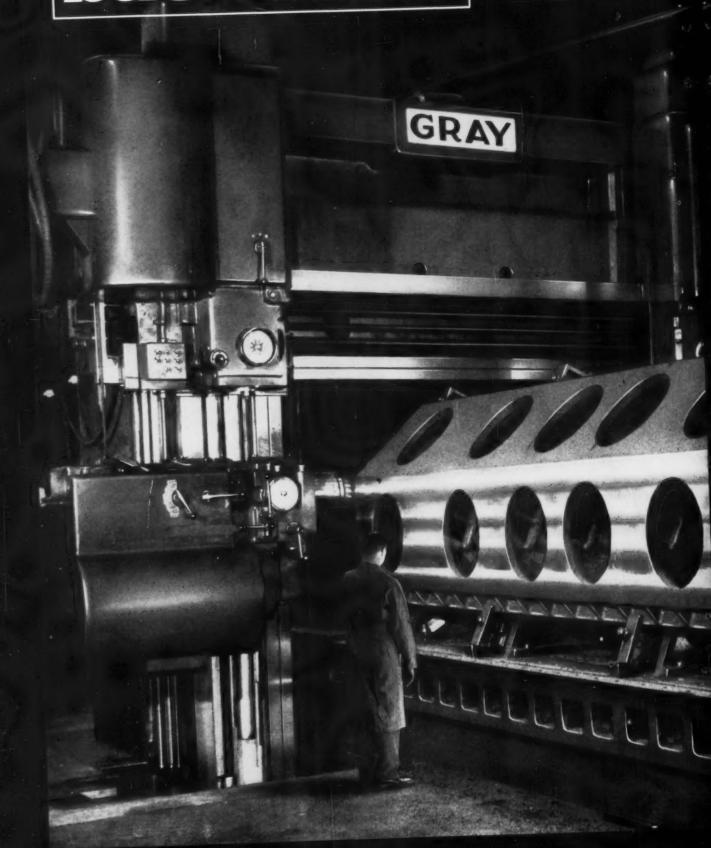
ADDRESS

TITLE

569

SHARONSTEEL

backbone of a





Gray unit head planer type millers dominate the field of heavy duty milling. This 96" x 96" x 26' monster can simultaneously deliver over seventy-five horsepower to each of its four cutters. A total of over 300 horsepower cuts a big job down to size in a hurry.

A simple ever present pendant control encourages maximum efficiency right up to the closing bell. No longer is the operator a workman--he's a pilot.

All this, plus mirror smooth surfaces milled to precise tolerances, maintain the Gray reputation for top quality the world over.





# See how Trackmobile streamlines freight oar handling

SEND FOR THIS BOOKLET! Looking for increased manpower efficiency? "Working for Profit", the new pocket-size booklet, shows how Trackmobile moves freight cars as they are needed...eliminates jammed sidings...converts to road wheels to get around bottlenecks...pays off with as few as 3 car moves a day. Shown above is just one of several pages describing how Trackmobile works for many industries.

This booklet also shows how to speed materials handling with Whiting Cranes and Trambeam Overhead Handling Systems. In addition, it describes many other types of Whiting equipment. Here are 32 pages of profit-building ideas, indexed by type of industry for your convenience. Write for your copy. Whiting Corporation, 15601 Lathrop Avenue, Harvey, Illinois.

WHITING

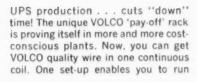


MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; TRACKMOBILES; FOUNDRY, RAILROAD AND CHEMICAL PROCESSING EQUIPMENT

# more ups less downs

with VOLCO wire pay-off and storage rack

Patent Pending



many times the usual length of wire . . . reducing ''down'' time, cutting operating costs, increasing production. The new VOLCO 'pay-off' racks pay off in many other ways, too: easily transported by any fork lift truck; easy

Pay-off' racks stack into space-saving stockpiles. No weight ever rests on wire coils.

stacking conserves costly storage space; less stop and start — less manpower needed, too. It's another great VOLCO innovation, and one more reason why VOLCO service betters your product — at no extra cost to you.

Contact your Volco representative today for further information.



#### VOLCO BRASS AND COPPER CO

BRASS . COPPER . BRONZE . NICKEL SILVER: WIRE . ROD . STRIP . SHEET

Mills and Sales Office: Kenilworth, N. J., Chestnut 5-7200 · New York Phone: WOrth 2-7500 Branches: Chicago · Philadelphia · Cleveland · Providence · Hartford



Contour machining of an aft dome for a U.S. Army missile.

## FOR MISSILES HARDWARE... investigate our ingenuity and ability to produce in a hurry

We have delivered aft dome rings, nozzles and sustainer parts in time to meet the most exacting requirements for production and test firing. We won't promise in advance we can solve all your missiles hardware problems on a quick delivery basis. But we invite you to look into our unusual service. Standard Steel Works boasts the facilities to produce anything—forgings and rings from

4130 aircraft quality analysis or special to-order analyses—in a hurry.

Man is beginning to conquer outer space. Standard is ready to play its part in this history-making achievement. We think you will find our combination of personalized service and know-how unique in the steel industry. Write Dept. 1B.

#### Standard Steel Works Division

BALDWIN · LIMA · HAMILTON



BURNHAM, PENNSYLVANIA

Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes







Hamilton 500-ton 4-point eccentric press

# Hamilton mechanical presses spell the maximum in versatility

No matter what your press requirements are, you probably won't have to incur the extra expense of special designing and "tailor-made" manufacturing if you explore the versatility of the two basic Hamilton press designs pictured above.

The Hamilton 400-ton 2-point eccentric press represents our conventional design, meeting all the basic needs of stamping plants all over the world. And it is so designed that many optional features may be readily added to transform it into a press capable of doing more highly specialized work.

Extra features include automation equipment, air and electric controls and outlets, die lights, die safety blocks, provision for feeds, inbuilding and automatic circulating oil lubrication. These features are built into the 4-point press shown above. Let your Hamilton sales engineer discuss your needs with you.

Hamilton Division Hamilton, Ohio

BALDWIN · LIMA · HAMILTON

Diesel engines • Mechanical and hydraulic presses • Can making machinery • Machine tools





#### **AUTOMATIC BAR MACHINES**

HELP YOU BEAT RISING PRODUCTION COSTS

The cowman achieves speed and power in a good "using" horse by years of careful breeding . . . Greenlee develops these same qualities in its Bar Automatics by continuous research and design improvement. One of the many superiorities of this speed and power is that it enables you to take full advantage of modern tooling practices. Your Greenlee representative will be glad to show you how it is done. Please submit print when inquiring about a specific job.

Write for Catalog No. A-405



#### SIX AND FOUR-SPINDLE AUTOMATIC BAR MACHINES

**GREENLEE Special Machine Tools** 

- Multiple-Spindle Drilling and Tapping Machines
- Transfer-Type Processing Machines
- · Hydro-Borer Precision Boring Machines

GREENLEE

BROS. & CO.

1802 MASON AVE. ROCKFORD, ILL.



This Recuperative Atmosphere Rotary Scale-Free Heating Furnace, manufactured by The Lithium Company, Newark, N. J., employs Norton segmented conduits — engineered and prescribed CRYSTOLON

tongue and groove tiles. Other Norton refractory shapes in the furnace are ALUNDUM burner blocks — equally efficient in aiding Lithium's recognized advancement in many heating operations.

# Lithium Company reports advantages of Norton refractories

CRYSTOLON\* and ALUNDUM\* shapes provide long, trouble-free service

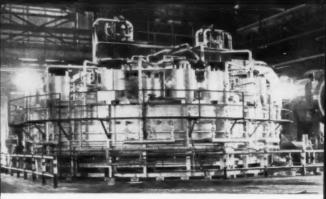
Selected by The Lithium Company for hot strength, high refractoriness, thermal conductivity and low thermal expansion, segmented conduits made of Norton CRYSTOLON tile give long, trouble-free service at temperatures up to 2900°F.

ALUNDUM burner blocks have the same useful qualities, plus resistance to chemical attacks at temperatures up to 3450°F.

To Improve Your Own Furnace Performance

See your Norton Representative or write for descriptive literature to Norton Company, Refractories Division, 201 New Bond Street, Worcester 6, Mass.

\*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries



One of a group of Recuperative Rotary Forging Furnaces installed by Lithium Company in a leading automotive plant for the production of scale-free heated billets to temperatures of 2400°F.



REFRACTORIES

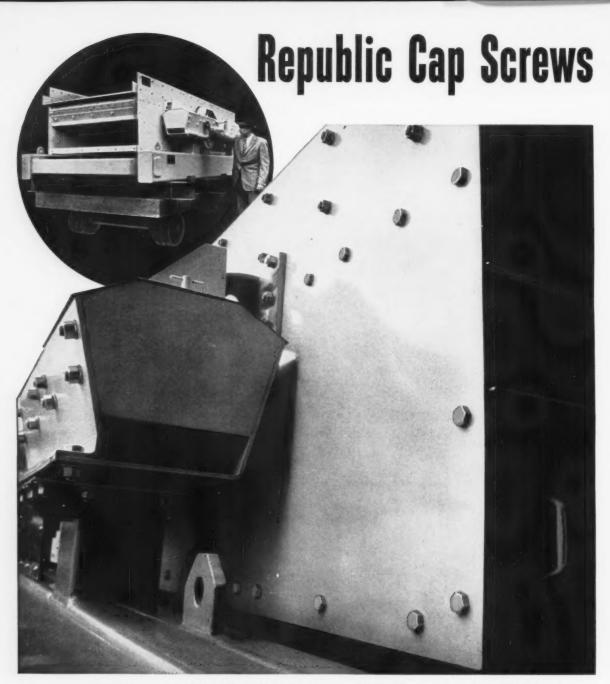
Engineered ... R ... Prescribed

Making better products . . . to make your products better

NORTON PRODUCTS:

Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING DIVISION:

Coated Abrasives • Sharpening Stones • Behr-cat Tapes



FINAL ASSEMBLY OF MAJOR COMPONENTS on Ty-Rock Vibrating Screens uses fine-thread cap screws of several different steel analyses, depending on particular application. The W. S. Tyler Company finds this construction distributes loads better and eliminates danger of fatigue failure due to vibration and cyclic loading. Republic Cap Screws have proved more than equal to every requirement.

## REPUBLIC



World's Widest Range of Standard Steels

# **Protect Shaker Screen Performance**

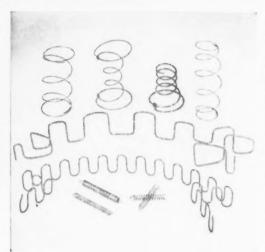
Sorting and sizing ton after ton of jolting, jarring, abrasive material is all in a day's work for Ty-Rock Vibrating Screens, built by The W. S. Tyler Company of Cleveland, Ohio. Satisfactory performance under these brutal conditions requires not only design and manufacturing skill, but a thorough knowledge of materials.

For example, Tyler has studied all types of fasteners and techniques to determine the best method of assembling heavy components. Experience has proved Republic Cap Screws more than a match for this rugged application. The clamping force produced by these strong, precision fasteners withstands both severe vibration and dynamic loading without stretching or danger of

fatigue failure. The result is year-in, year-out dependability of Tyler equipment, plus easy replacement of particular parts subject to extreme abrasion.

Maximum performance under all operating conditions is typical of Republic's complete line of top-quality cap screws. Types include Hex Head, Flat Head, and Fillister Head in a wide range of sizes. All are available with either coarse or fine threads in high carbon, heat treated steel and low carbon, bright steel—plus many analyses of alloy steel and Enduro® Stainless Steel. All have finished points and full-size bodies.

For complete information on Republic Cap Screws, contact your local Republic office. Or mail coupon for data.



SPRING WIRE PERFORMANCE in your product is assured by Republic quality. Standard High Carbon Spring Wire and MB High Carbon Wire are produced by specialists who know and understand both steel making and high carbon wire drawing practices. They know spring forming machines and the importance of physicals, flnish, cast and size accuracy in the end product. Republic Hard Drawn Round Steel Spring Wire, untempered, is providing outstanding performance in automotive seat and back cushions, furniture, bedding, and mechanical spring applications. Lower chemistry Border, Brace, Link and Crimping Wires are produced to the same high quality standards. Our metallurgists will assist you in selection, application and processing. Send coupon for details.

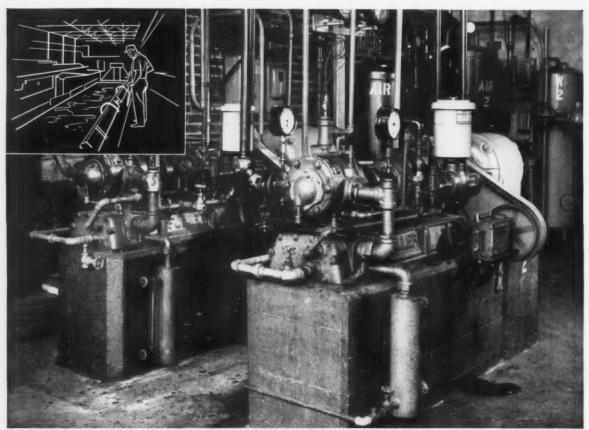


PERFORMANCE OF THIS SAFETY BOOR LATCH is protected by Republic Nylok® Bolts. They adjust to permit precise positioning of striker plate. Nylon pellet imbedded in bolt forces fight metal-to-metal lock between opposite threads, whether or not fastener is seated. Striker plate is permanently positioned to assure proper operation. Send coupon for facts.

# STEEL

and Steel Products

REPUBLIC STEEL C DEPT. C-4396-AR 3104 EAST 45TH ST	ORPORATION REET • CLEVELAND 27, OHIO
Please send further in  Cap Screws  Nylok Bolts Spring Wire	formation on:
Name	Title
Company	
Address	
City	Zone State



These two-stage Fuller Rotary Compressors are direct electric motor driven through flexible couplings to provide compressed air for a large eastern steel company.

# 5 YEARS WITHOUT A HITCH! ... FULLER Rotary Compressor helps keep steel plant operating around the clock!

Compressed air is so vital in the alloy tube division of this large eastern steel company, that the plant would have to shut down without it!

The chief maintenance engineer of the company writes: "The first Fuller Rotary Compressor was purchased on the basis of experience by other users and cost comparison with other compressors.

"The second Fuller Rotary Compressor was purchased on the basis of the fine performance given by the first compressor. The most outstanding feature of Fuller Rotary Compressors is that they give troublefree continuous operation". Fuller rotary compressors can be installed in limited quarters and on ordinary flooring. They give long life and smooth operations. The elimination of valves, crankshafts, pistons and other moving parts greatly reduces the need for attention, adjustment and replacement. Blades are held out by centrifugal force, automatically compensating for wear, thus maintaining new machine efficiency and capacity. The rotary principle permits a design completely free of reciprocating parts, avoiding the basic cause of pulsation. There is a Fuller Rotary Compressor to fit your

particular needs. Write today for complete details.

"See Chemical Engineering Catalog
for details and specifications."





#### FULLER COMPANY 122 Bridge St., Catasauqua, Pa.

SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
Birmingham • Chicago • Kansas City • Los Angeles • San Francisco • Seattle

PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

# are You interested in PROFIT DEVELOPMENT

through reduced machining time and Lower Costs . . .

The new 66" Bullard Cut Master, Model 75 purchased by E.D. Jones & Sons Co., Pittsfield, Mass., has reduced from 65 to 48 hours the machining time required for a 4,000 lb. stainless steel piece used in a papermaking machine.

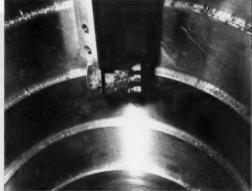
The Bullard Cut Master V.T.L., Model 75 line offers many features and advantages to help you — cut costs when cutting metal.

The part, 68" high, formerly had to be machined in three operations. Now, with an extension on the 62" Ram, a table speed of 9.6 r.p.m., feed of .0208 and \( \frac{1}{8} \)" depth of cut, it is possible to machine the entire depth in one operation.

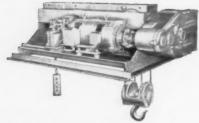
Complete details are available from your nearest Bullard Sales Office or Distributor or write

THE BULLARD COMPANY

BRIDGEPORT 9. CONNECTICUT



Close-up showing step boring and facing operation with 370 grade carboloy tool.



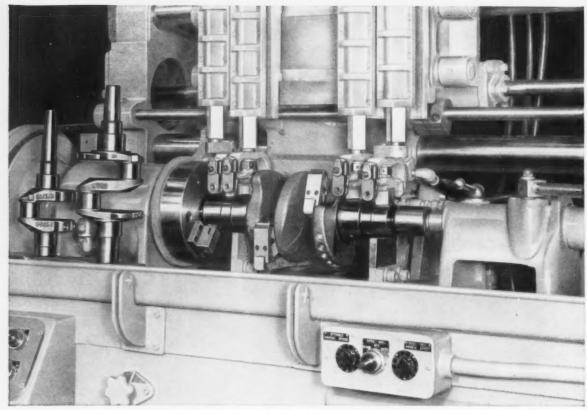
Qual-Duty two speed hoists give you precise load spotting, plus fast lifting when you want it. Four outstanding advantages make R&M Dual-Duty hoists your best buy when you can't afford performance compromises: 1) You always have two stabilized speeds to raise or lower any load within the capacity of the hoist. 2) Dual Duty hoists are thus easy to operate-they perform exactly the way the operator wants them to. 3) First cost and maintenance are low because electric controls are simplified and trouble-free. Dependable polyphase squirrel cage R&M hoist motors are weatherproofed for extra protection. 4) R&M has the widest line of job-proven two-speed hoists available: 5 frame sizes, 25 speedload choices, with 3:1 or 4:1 gear ratios. Capacities: 1,000 to 20,000 pounds. Controls: 2 or 4 pushbutton. Mounting: Lug or hook-plain, geared, or motorized trolleys.

### slow spotting, fast lifting hoist

drum is heavy steel pipe or solid cast iron-plow steel heat treated 6 x 37 cable is used alloy steel gears and shafts two speed R&M motor especially designed for hoist duty upper limit switch Take it up with Robbins & Myers, Inc. protects mechanism, Hoist & Crane Division adds safety Springfield, Ohio (Brantford, Ont.) Send me Dual-Duty hoist bulletin. Name\_ Title\_ Company\_ 4 pushbutton is standard-2 push-Address\_ button is optional at no extra cost

ROBBINS & MYERS hoists • cranes • winches





Gisholt 51A General-Purpose Superfinisher handles 44 to 53 crankshafts an hour with 80% efficiency—with one-hour change-over from one crank size to another. Each set of stones Superfinishes over 200 crankshafts on this job.

### What Onan is doing with Superfinish

Handles crankshaft mains, pin bearings and oil seals simultaneously...gets finer finish at lower cost

There may be a tip for you in the way D. W. Onan and Sons, Inc., Minneapolis, is finishing crankshafts on a high-production basis.

Here's how a Gisholt Model 51A Superfinisher handles up to 6 different diameters in one operation, finishing a variety of single- and 2-throw crankshafts. Loading rails, with a special spindle-inching arrangement for driver positioning, make loading and unloading larger pieces fast and simple.

In a typical operating cycle, the crankshaft is driven between centers from the keyway, using a faceplate driver. Two special latch-on, follower-type arms engage with the crank pins, and 4 longitudinally adjustable quills descend to Superfinish main bearing and oil seal surfaces. Main and pin bearings are reduced from a ground surface of 30 micro-inches RMS to 8 or less. Oil

seal surfaces on the shaft ends are Superfinished to 4 micro-inches or less.

Gisholt Superfinishing helps market your product more easily against rising competition. By reducing—or even eliminating—the cost of grinding, polishing, lapping or buffing operations, this modern method provides substantial savings. Chatter marks, grinding flats and amorphous "smear" metal left by grinding are completely removed, exposing true base metal for longer wear and better performance.

Ask your Gisholt Representative for details on the complete line of Superfinishing machines—including Superfinisher attachments, general-purpose models for job-lot production, and high-production models adaptable for automation. Make an appointment with him today—get the facts on this inexpensive process.





WRITE TODAY for "Superfinishers" (Form 1169-A), 30page illustrated booklet explaining Gisholt Superfinishing process in interesting detail.

Madison 10, Wisconsin, U.S.A.

ASK YOUR GISHOLT REPRESENTATIVE ABOUT GISHOLT FACTORY REBUILT MACHINES WITH NEW MACHINE GUARANTEE

# THE QUENCHING SPEED TO MEET YOUR NEED



## ... Proved by this New Testing Method

Perhaps you don't always need a really fast quenching oil. But when you do... Houghton has it... as proved by the new Magnetic Quenchometer developed by General Motors Technical Center.

This new, accurate test clearly proves HOUGHTO-QUENCH "K" is the fastest quenching oil on the market today... the best and safest quench you can buy for getting maximum hardness in lean alloy steels.

The test uses a pure nickel ball, heated beyond the temperature at which it is entirely non-magnetic (1,625°). The heated ball drops into a container holding 200 cc. of the quench being tested, starting a timer the exact instant it enters the quenching bath.

At the exact instant the nickel ball has cooled to the temperature at which it regains its magnetic properties (Curie point, approximately 670°), it is drawn to a magnet. This action shuts off the timer.

The Magnetic Quenchometer has disclosed much useful data on the excellence of the various types of HOUGHTO-QUENCH and the other Houghton Quenching Oils as well.

It's a good idea to ask the Houghton Man about Quenching the next time he calls on your plant. If you need speed, he'll show you how to get it with HOUGHTO-QUENCH, the fastest quench this side of water. Or, if speed is not your prime requirement, he can recommend from a variety of Houghton oils the one best suited to your needs.

Why not make Houghton your heat treating headquarters? Call the Houghton Man today, or write direct to E.F. Houghton & Co., 303 West Lehigh Ave., Philadelphia 33, Pa.

## HOUGHTO-QUENCH IS DIFFERENT

... a product of

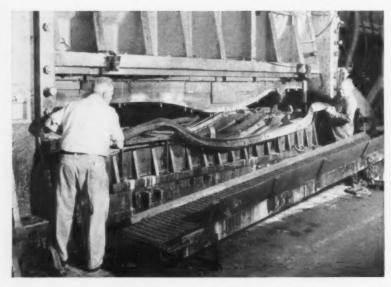




Twelve different types of frames for one automaker alone are fabricated from Pittsburgh Steel Company sheet in

the Detroit Division of Dana Corporation. Here completed frames are moving to the paint shop.

## Pittsburgh Steel sheet helps auto designers improve cars



Steel strip begins to look like the side-rail of an automobile frame. This big forming press forms the blank into half a side-rail section.

### Improvements In Frames Demand Better And Better Steel

Formability of sheet steel is speeding production for a large manufacturer of auto frames.

At Dana Corporation's Detroit Division, where as many as 4,000 frames can be made in a single day, a unique forming operation has been developed which requires a high degree of this quality called formability.

Known as edgewise bending, the operation would be impossible without hot rolled sheet steel of top quality—like that supplied Dana Corporation by Pittsburgh Steel Company. Because sheet from Pittsburgh Steel has great formability it undergoes severe deformation without rippling, tearing or peeling.

This kind of formability is important to sheet users every-

where who process steel into finished products.

At Dana, cut lengths of sheet are sheared into strips which measure approximately 205 inches long for one standard type of auto frame. These blanks move through a specially-designed edgewise bending machine which holds each strip perfectly flat while pushing part of the strip against one edge. At the same time that two sections of the strip are being pushed edgewise a total of 13 inches, the remainder of the strip is held motionless and straight.

· Kick-ups in Frames. The result is two curved sections, one near each end of the strip. These curves give the finished frame the "kick-ups" over the wheels which allow modern cars to hug the road.

Edgewise bending replaced a process which required taking a much larger piece of steel and cutting out the desired curved shape, cookie-cutter fashion, with a high scrap yield.

Only the best sheet steel will take edgewise bending with the steel flowing smoothly into new shapes. That happens when steelmakers achieve just the right degree of formability while keeping steel's inherent toughness.

Consider what has happened in the making of auto frames alone to see how the automotive industry's demands resulted in better sheet steel.

Only five years ago, one of the best known makes of cars had only three standard frames. Now it has twelve. In the intervening years, frames have become 50 percent stronger. They're now made with more severe bends. They're wider and made of steel 40 percent thicker on the average. "Kickups" have become higher and higher.

· Rigid Specifications. Specifications for physical characteristics and grain structure became more rigid as frames underwent an increasing amount of shearing, punching, die and press work and welding.

Ever since Pittsburgh Steel Company entered the sheet market, its hot and cold rolled sheet has kept pace with the demands for steel that could take more and more deformation.

Whatever your use for sheet, you can benefit from the skilled know-how that has constantly improved the quality of Pittsburgh Steel sheet.

You'll benefit from increased formability that gives you faster, smoother production with fewer rejects. You'll gain, too, from steel of increased toughness. Start benefiting today by calling the nearest Pittsburgh Steel Company district sales office.



Edgewise bending of sheet steel strips is a unique operation at Dana. This machine pushes each strip into a curved section by holding part of it firm while pushing against the edges of other sections.



After edgewise bending, the steel strips are curved at each end. These curves will provide the "kick-ups" which are necessary for extra room over each wheel.

## Pittsburgh Steel Company

**Grant Building** 

Pittsburgh 30, Pa.



**District Sales Offices** 

Atlanta Chicago

Cleveland Dallas

Dayton Detroit

Los Angeles New York Philadelphia Houston

Pittsburgh Tulsa Warren, Ohio





It's often the seemingly simple parts that cause the production "headaches". In this case the "butterfly"—the simple disk and shaft assembly in an exhaust gas actuated power brake. These small parts presented complicated machining and fabricating operations. The elliptical shape of the disk, the compound bevel of the disk edges, the slotting of short length of shafting, welding the shafting in perfect center and alignment on the disk and finally the turning of the shaft ends or bearings. All this fabrication had to be done in a heat-resistant steel to eliminate warpage of the disk, because the blow-by of exhaust gases would result in decreased operational efficiency of the power brake unit.

Oftentimes the answer to such a problem can be as simple as this one was.

... "Shellcast this part". And the result ... a one piece casting combining the elliptical beveled disk with an integral shaft. Cast so smooth and to such close tolerances that the only machining operation to be performed was the bearing ends of the shaft. Heat-resistant ESCO Alloy 43H, (A297-55 Grade HH) also eliminated the warpage problem at the same time.

Whether you make butterfly valves, or any one of a million or more complicated components of either low or high alloy steels, before you say "machine this part" call an ESCO Casting Engineer.

Write for ESCO booklets No. 175 and No. 205.



### ELECTRIC STEEL FOUNDRY COMPANY

2184 N. W. 25TH AVE. • PORTLAND 10, OREGON
MFG. PLANTS AT PORTLAND, ORE. AND DANVILLE, ILL.
Offices in Most Principal Cities
ESCO INTERNATIONAL, NEW YORK, N. Y.
IN CANADA ESCO LIMITED

Kickbacks 40 Retarder No. 7 North Inert No. 6 Barney Retarder Retarder No. 3 Retarder Retarde Building Retarde No. 2 Retarder No. 1 Empty North South Thawing Thawing House House

How the new UNION car-retarder system works — Pier 18 has two coal dumping systems and both use the same empty yard. Following through the operation of the North dumper, a loaded coal car leaves the North thawing house, rolls down an incline to retarder No. 1 where its exit speed is reduced, so that when the car rolls on to the "barney" pit, it is stopped by inert retarder No. 4. A "barney" then pushes the car up the slope to the dumper where it is stopped by retarder No. 5. Coal is then dumped into a barge.

The next full car pushes the empty car off the dumper. It goes by gravity through a kickback and spring-switch combination for return through retarder No. 2 to the empty yard. Controls for the power retarders and switches are incorporated in a control machine housed in a new tower building. One operator in this tower surveys the operation and operates the control machine. He has loudspeaker communication with the thawing sheds, the control cabins on the dumpers, and the yard office.



General view of North and South dumpers showing No. 2 and 3 retarders in foreground. Car entering retarder is going to the empty yard.

## Fast, low-cost coal handling results from Automation at Pier 18

The Central Railroad of New Jersey recently modernized its coal dumping facilities at Pier 18, Jersey City, N. J. Now, one man sits in a tower, flicks a few levers, and controls loaded coal cars rolling by gravity to the dumpers and empty cars moving from the dumper to the empty yard. Formerly, this job required a crew of car riders and was a costly and hazardous operation.

Now, the job is handled quickly, safely and economically through a system of UNION Electro-Pneumatic Car Retarders. Operating costs have been greatly reduced, and coal is promptly loaded for shipment by barge to New York and New England areas.

What is your materials handling problem? If it involves many carloads of coal, ore or other products, let us show you what can be done with automatic car-retarder systems to increase efficiency and reduce costs. Write for information.

### M UNION SWITCH & SIGNAL

DIVISION OF WESTINGHOUSE AIR BRAKE COMPANY

SWISSVALE, PENNSYLVANIA

NEW YORK ...... PITTSBURGH ..... CHICAGO ..... SAN FRANCISCO

START



### ONLY ONE TO A CUSTOMER

#### What's Your Heart Worth?

Of course, you can't put a price on a healthy heart! If you could, the cost would be beyond calculation.

For the engine hasn't been made that will out-perform this fist-sized powerhouse which pumps five to ten tons of blood daily, and beats nearly 3 billion times in 70 years.



The High Cost of Heart Disease — Hearts come only one to a customer. That is why it is urgent for you to keep up the fight to guard yours from disease. Diseases of the heart and circulation kill more than 800,000 persons annually. An estimated 10,000,000 people are afflicted — 500,000 of them children.

Research Is Saving Hearts – Thanks to heart research, some forms of heart disease now can be prevented, some cured, and almost all cases can be helped through proper treatment after early diagnosis. Thousands of Americans are now living because research has developed new methods of preventing and treating certain forms of heart and circulatory disease.

Invest in the Heart Fund — When you give to the Heart Fund, you are making an investment in your future. You are helping your Heart Association bring the latest advances to your doctor so that he may guard your heart and the hearts of those you love. Your Heart Fund contribution helps your Heart Association fight Heart disease through:

- Research
- Public and Professional Education
- Community Heart Programs



GIVE TO FIGHT HEART DISEASE

Help your Heart Fund Help your Heart



### This is America's basic growth steel

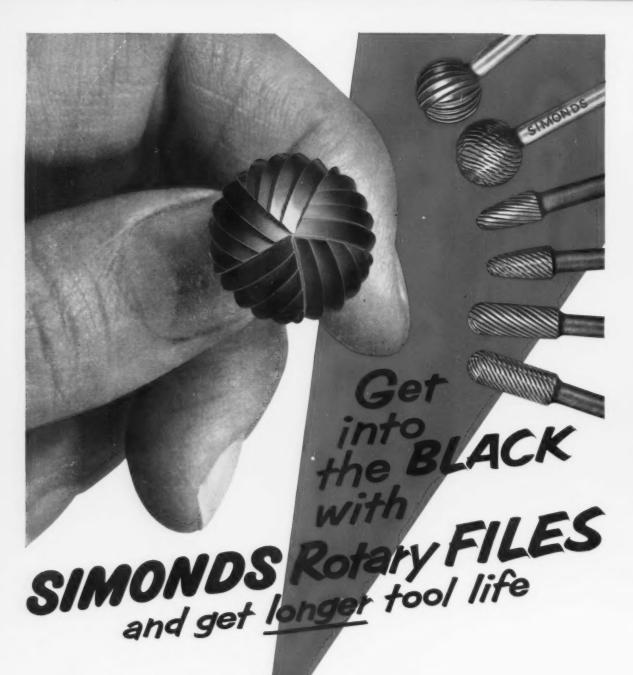
This is structural steel taking shape. Together with steel plate, structural steel shapes have played an indispensable part in America's growth.

And America is still growing . . . stretching out roads and bridges in a 100-billion-dollar highway program . . . constructing plants and buildings for its fast-increasing industry . . . turning out more and more new and basic products with the old reliables, structural steel shapes and steel plate.

Barium Steel plants have more than a 100-year history of growth through their contributions to industrial America. And by specializing in indispensable steel products—structural shapes, steel plate and heavy wall seamless pipe and tubing—Barium will continue to grow and to play an active part in the nation's expanding economy.



BARIUM STEEL CORPORATION, 25 BROAD STREET, NEW YORK 4, N.Y.



Simonds gives these hardened High Spee St. Rotary Files an extra-special terminal hardening which pays off to you with a sharp in the see in wear-resistance. This final operation gives these their distinctive black color.

And this black color now becomes the "market-mark" of the longest-lasting, fastest-cutting files of this type.

Furnished in Hand Cut or Ground-from-Solid types in a full range of standard shapes and sizes. Special shapes made to order. When dull, we can re-sharpen these files by regrinding and repeating the terminal hardening process.

Try these easy-to-recognize, longer-lasting Simonds Rotary Files and get *more* for your file dollars.

Look for the Simonds name on the black shank.



Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon Canadian Factory in Mantreal, Oue., Simonds Divisions: Simonds Steel Mill, Lockport, N. Y., Heller Tool Co., Newcomerstown, Ohio Simonds Abrasive Co., Phila., Pa., and Arrida, Que., Canada

For Fast Service from Complete Stocks

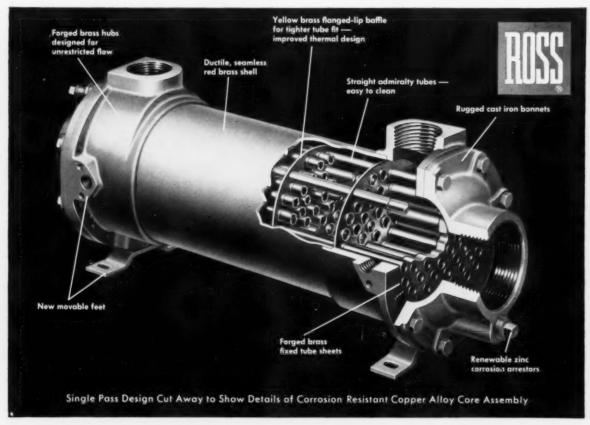


SIMONDS ndustrial Supply



### LOOK AT THE LEADER'S LATEST ...

## '58 design of a famous line . . . Ross BCF Exchangers



**LOOK AT THE LIST...** new design features, new sizes, new capacities, new mountings, new materials... new low prices! In 1958 the leader and originator of small, compact, fully standardized exchangers takes another step forward.

The Ross Heat Exchanger Division of American-Standard originated the whole BCF idea 14 years ago. Before then, pre-engineered design, mass produced parts and stocked assemblies were untried for a unit of this type. Designers and users of original equipment were quick to adopt the BCF as standard. Today, on a larger scale than ever, it is cooling lube oil, jacket water, hydraulic and other fluids for a wide variety of industries.

But, even with such success, the BCF has never been permitted to stand still. Ross has persisted in making constant design refinements and performance improvements . . . 1958 is typical: New baffles with flanged lip at each tube hole and around outer edge for tighter fit and improved thermal characteristics. New stamped steel feet, movable in three positions around hubs for easy, more adaptable mounting. New sizes and capacities . . . 46 models . . . one, two or four pass designs . . . giving greater selection than ever before.



Look at the leader's latest. Send in the coupon below for the new Ross Bulletin . . . an up-to-date run down on the 1958 Ross Type BCF Exchanger.



Mail this coupon for new Ross Bulletin

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new Bulleti	d, without obli n 1.1K6 descr BCF Heat Exch	ibing the 1958
NAME		unger.
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## It's AO's New "482A"!

Once again American Optical engineering and research make a good product even better! This light, comfortable flexible mask goggle offers the trustworthy, optically correct protection which has made it so popular PLUs the new features above. It's a better buy than ever! Recommended for protection against flying particles striking from any direction in babbitting, chipping, cutting rivets, light grinding, on hand or machine tool work, or where spark-explosion hazards endanger. Your nearest AO Safety Products Representative can supply you.

(Vinylite Mask Goggle)

#### Quick Facts

**Lens** — Interchangeable, one-piece acetate, easily removed and replaced. Curved slightly for increased field of vision. Provides greatest worker comfort, safety, efficiency.

Frame — Soft, face-hugging vinylite provides maximum flexibility and full protection.

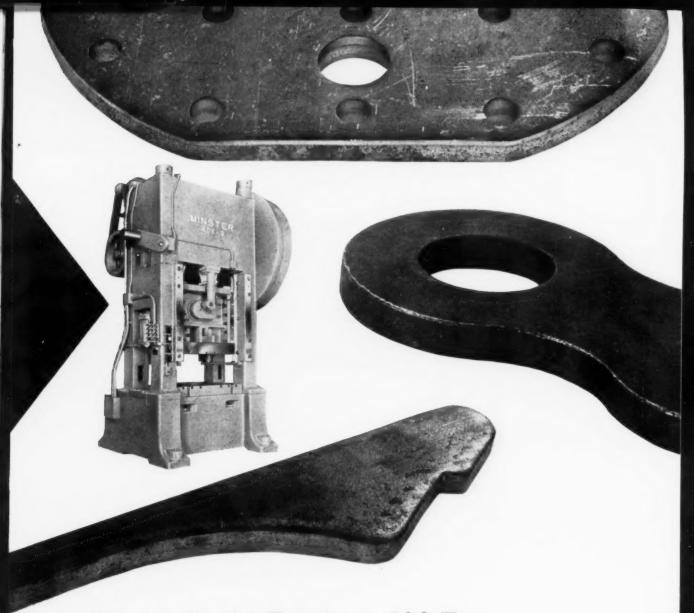
Headband — Elastic, easily adjustable.

Color — Clear frame, clear or green lens. For green frame, clear or green lens specify Catalog No. 483A.

Always insist on the Trademark on Lenses and Frames American Optical Optical Optical Optical

SOUTHBRIDGE, MASSACHUSETTS

Branches in Principal Cities



## How to do the Toughest 400 Ton Heavy Material Blanking Jobs economically

Use a press properly designed to exert the tremendous forces required.

Use a press with the rigidity and mass to withstand the terrific shock of impact and sudden release of "snap-through" force encountered when blanking, punching or shearing heavy material.

Use a press that will give you high production with longer die life.

Use the heavy duty blanker ... MINSTER 40E-9

The construction features that put the Minster 40E-9 press in a class by itself for this type of work are described and illustrated in a new Bulletin No. 12. May we send you a copy?

THE MINSTER MACHINE COMPANY . MINSTER, OHIO

# 8-year accelerated tests at HARVEY ALUMINUM prove LaSalle STRESSPROOF° and FATIGUE-PROOF° better than heat treated steel of even higher

### ...also cut costs by 25%

The design requirements of the new Harvey Aluminum Reduction Plant at The Dalles, Oregon, demanded the best available materials. Harvey is the largest independent fabricator of wrought aluminum mill products, and, as a metallurgical concern, their manufacturing requirements go beyond ordinary interests.

One of the vital components of the plant is the anode jack assembly. The assembly operates under a 60-ton load and under adverse conditions. Failures here cannot be tolerated because they would stop production and create a tough maintenance problem.

The chief project engineer knew he could not take chances . . . and set up tests simulating as nearly as possible actual operating conditions. Sample parts were made from those grades of steel bars which appeared to be most suitable.

In comparative accelerated tests, considered the equivalent of 8 years' service, STRESSPROOF and FATIGUE-PROOF were selected not only for the necessary properties but because they performed best under these rigid tests.

Vendors making the parts also found that these steel bars consistently machined easier than the heat treated steels and cut their costs.

**GROUND AND POLISHED** 



WITH COPPER

### PROVED BETTER THAN:

A-4140—Heat Treated Rc28-30 C-1040—Heat Treated Rc28-30 C-1144—Cold Drawn and Strain Relieved

## 2,025 better shafts ...at 25% savings

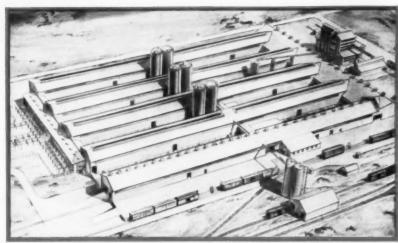
**TEST No. 1:** After submitting sample shafts of each of the analyses shown at the left to the accelerated tests for wear, strength, and overload, stressproof anode shafts were proved superior. (1) stressproof gave consistent and faster machining. (2) stressproof shafts required no straightening. Other materials warped after machining. (3) stressproof showed excellent wear characteristics under applied load. (4) stressproof shafts were produced at a savings of 25% over the other materials tested.



La Salle STEEL CO.

1436 150th Street, Hammond, Indiana

## steel bars hardnesses



Harvey Aluminum Reduction Plant, The Dalles, Oregon.

## fatigue-proof.

STEEL BARS

MADE BY C. L.C. PROCESS

Elevated Temperature Drawing

#### PROVED BETTER THAN:

A-4140—Heat Treated Rc35-38

A-4130-Heat Treated Rc35-38

A-5160—Heat Treated Rc35-38

C-1048—Heat Treated Rc38-40

## 2,025 better worms ...at 25% savings

TEST No. 2: Sample bars of each of the analyses listed at the left were also put through a test equivalent to 8 years' operation. After completion of tests, fatigue-proof steel showed excellent ability to work-harden and to withstand operating loads. Machinability was superior to the other grades tested and total cost of producing the worm gear was reduced by 25% with the use of fatigue-proof steel.

### also available from your steel service center

### LA SALLE STEEL CO.

1436 150th Street

Hammond, Indiana

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company.

address.

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- Please send the newly published engineering report, "The Effect of Copper, Abnormally Heavy Drafts, Furnace Treatment and Die Practice on STRESSPROOF Steel Bars."
- Please send 24-page bulletin,
  "A New Material," which presents
  the results of more than one
  year's tests and reports on eight
  application case studies of
  La Salle FATIGUE-PROOF steel bars.

## FREE YODER BOOKS OFFER "KNOW-HOW" ON ROLL FORMING • TUBE MAKING • SLITTING

OLD ROLL FORMING

### **COLD-ROLL FORMING**

Structural, ornamental and tubular shapes from stock up to ½" thick. Surface finish, uniformity, stock selection and characteristics, plating problems, production costs, end uses and applications. Auxiliary automatic operations including perforating, notching, welding, coiling, embossing. 88 pages, fully charted and illustrated.

### PIPE AND TUBE MAKING

Ferrous or non-ferrous, electric weld, resistance and induction or gas types. Small or large diameter. Tooling, welding, stock ranges, personnel training, quality and tolerance control, speeds, power consumption, annual production rating charts. 64 pages, fully illustrated.

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Operating techniques, time studies, analyses of operating cycles, coil handling, scrap disposal, selection of slitters and setting up of slitting lines, including coilers and recoilers. Advantages of slitting and how to compute "profit-point". 76 pages, fully illustrated.

Any or all of these books are free upon request. Send for your copies today . . . Ask for them by title.

### THE YODER COMPANY

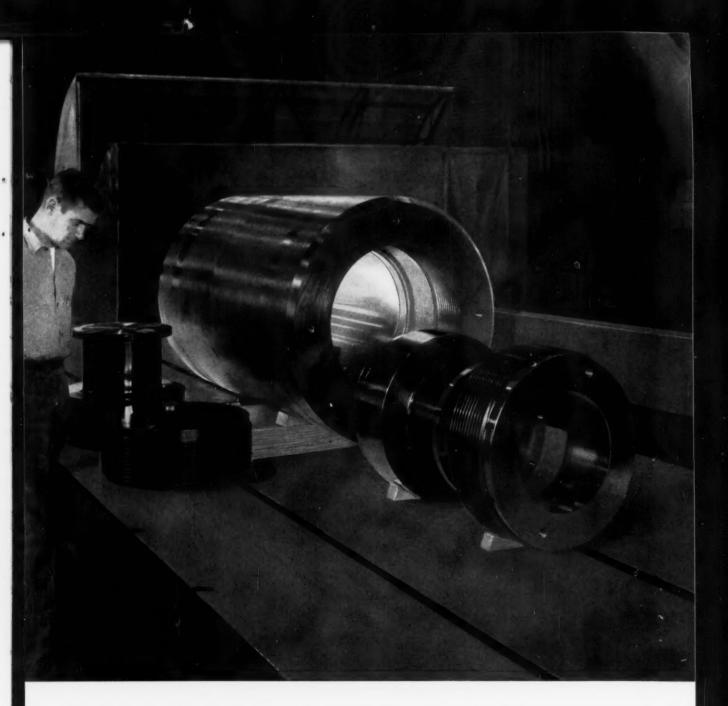
5510 WALWORTH AVE. . CLEVELAND, OHIO

VODER MANUFACTURING

COLD ROLL FORMING MACHINES

PIPE AND TUBE MILLS (terrous or non-terrous)

ROTARY SLITTING LINES



## WHO FORGES THE TOUGH ONES? & machines them, too

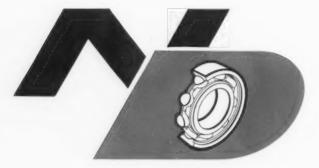
Assume that you've just designed a high pressure cylinder to be used in the production of high energy explosives. It is a good sized forging—the main cylinder is 50¼" long, 31½" O.D., and 18" I.D.—with high physicals. It must be forged of a highly alloyed chromium nickel molybdenum vanadium steel to obtain a tensile of 164,000 psi . . . a yield point of 153,000 lbs. . . . and hydrostatic test at 30,000 psi.

Naturally, you prefer one responsible source to do the whole job—one organization to melt the steel, forge, and finish all parts to exact prescribed tolerances.

So, call on National Forge, a company that's been producing big forgings for over 40 years—from melting steel through finish machining and protective coating (dulite, in this case) all in one completely integrated plant. Let us quote on your next job for big machined forgings—and demonstrate the answer to "who forges and machines the tough ones . . . best?"



DEPARTORE



## Symbol of a Reputation

... a reputation for integrity, for quality and service ... for advanced creative engineering achieved by New Departure in over half a century of precision ball bearing manufacture.

You'll find this emblem is also symbolic of our determination to continue, in the fullest measure, all those factors which have built that reputation. It is a visual pledge of this resolution to all our customers, present and future.





### NEW DEPARTURE

DIVISION OF GENERAL MOTORS-BRISTOL, CONN.

### Shuns Raised Standards

Profit sharing plans will do little to change UAW attitudes toward improved production techniques. At the UAW Special Convention a local leader attacked employee suggestion plans, calling workers having too much initiative or ingenuity a "menace" to employment and production standards. He cites an example whereby one suggestion eliminated 11 workers on a job.

### Adhesives Advance

The American Welding Society hasn't said so yet, but the next revision of the Welding Handbook will probably contain a comprehensive chapter on adhesive bonding. This recognition by welding equipment makers is proof, say makers of adhesives, that they must now be considered a full-fledged facet of the industrial metal-joining industry.

### Speed Barrel Finishing

Combine the principles of rotation and vibration, and you can barrel finish inside diameters. Furthermore, the combination cuts time cycles up to 70 pct. At slow barrel rotation, the process makes it feasible to handle delicate or large parts without fixturing.

### **Need Research Managers**

Good project managers for military research are in short supply. Lack of them is a bigger problem than interservice rivalry in basic studies. Fiscal or buying experts shouldn't be allowed to call research signals, Army tells Congress. While getting trained managers is the first need, keeping them throughout the program is the second.

### Four-Man Foldup Car

British airborne troops are testing a fourpassenger folding car that can be dropped by parachute, assembled in one minute, and driven away. Folded up and stacked in a plane it appears to be a box, 20 x 28 x 104 in. It weighs 700 lb, less than one-fourth as much as a jeeptype vehicle. Transporting such cars would save enough in aviation fuel so that they could be fully expendable, it's said.

### Combine Forging, Casting

It now appears possible to incorporate the advantages of both casting and forging in a single part. On an experimental basis, both aluminum and magnesium castings have been forged to reductions of 15 to 20 pct. Result: a marked improvement in mechanical properties.

### Check Air in Hydraulic Oil

Dissolved or entrapped air in hydraulic fluids can hamper machine operation and upset the accuracy of flowmeters. Checking the total air contained in hydraulic oil hasn't been easy, but a simple new instrument will now give the answer in about two minutes. It sends an oil sample into a vacuum chamber where the fluid spreads into a thin film on steel balls and releases its entrapped air. The before-and-after pressure difference indicates total air content.

### New Blast Furnace Tuyere

Said to have at least five times the service life of conventional designs, a new type blast furnace tuyere features efficient cooling. Field tests over the past four years show that tuyere cost per ton of iron was cut 77 pct. Iron tonnage lost due to tuyere replacement was cut 73 pct.

### Stress on Flatness

Increased attention is being given to abrasive belt grinding as a way to meet severe Air Force requirements on flatness in wide sheets. Conventional rolling mills work to 10 pct tolerance, while aircraft and missiles requirements are 2.5 pct. Designers would like 1.0 pct. One titanium producer is installing a 48-in. grinder to do 2 pct. Grinding machine designers are proposing widths up to 120 in.



## Clevelands drive cooling bed of highly automated

## Canadian tube mill

Here is the cooling bed—driven by 3 Cleveland speed reducers—of the world's first completely automated seamless tube mill. It was built by Mannesmann-Meer Engineering & Construction Co., Inc., Easton, Pa., and installed at the Sault Ste. Marie plant of Mannesmann Tube Company.

Practically everything in the entire plant is automatic—handling of materials from stage to stage, as well as individual operations.

You'll find Clevelands in nearly every steel plant in America—wherever dependable, heavy duty drives are demanded—many of them in continuous service upward of 35 years.

Write for new Bulletin 145 which shows

the many types available in the Cleveland line. The Cleveland Worm and Gear Company, 3282 East 80th Street, Cleveland 4, Ohio.

CLEVELAND
Worm Gear
Speed Reducers

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.



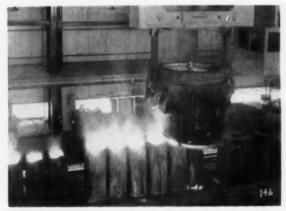
CHARGE IRON: Molten iron is charged into new basic oxygen furnace at Jones & Laughlin Steel Corp.



**THE MELT:** Basic oxygen vessels are making steel as fast as 70 tons an hour; could go higher.



**CHARGE SCRAP:** Basic oxygen furnaces operate with a maximum of about 30 pct ferrous scrap.



**THE TAP:** J. & L. figures on a tap-to-tap time of 37 minutes, or 40 heats in 24 hours' operation.

## Low Capital Cost Spurs Swing To Oxygen Steel

Here's the first comprehensive roundup on basic oxygen capacity in U. S. and abroad.

U. S. capacity will hit nearly 3 million tons this year, heading for 4.4 million in '59.

Low initial cost, cheap oxygen, tonnage applications, are behind spectacular growth of process.—By G. J. McManus.  Installation of two vessels at Jones & Laughlin Steel Corp, last year doubled basic oxygen steelmaking capacity in this country, sending it over the one-million-ton mark.

Capacity will again double this year, reaching 2.8 million ingot tons by the start of 1959. Another 1.6 million tons will be added during 1959, bringing the American total to nearly 4.4 million tons. Projects

not yet announced could easily add another million tons.

World Capacity — Outside the United States, the swing to oxygen steelmaking is equally rapid. Current world capacity of 5 million ingot tons will jump to nearly 17 million tons in the next two years. Nearly 60 individual oxygen vessels will be operating by 1959.

This is remarkable considering

that the first pilot plant for oxygen steelmaking was built less than 10 years ago and the first production model only six years ago.

What's Behind It?—Why all this activity? The answer is low capital cost. Oxygen vessels can be built for half the cost of openhearths delivering the same annual tonnage.

There are other factors. Basic oxygen steel has excellent qualities for the tonnage applications in this country. The makeup of most American ores ties in nicely with vessel requirements. New ways of making and supplying oxygen have paved the way for the process.

Equipment Cost Lower-But the

big thing is equipment cost. Fred M. Gillies, President of Acme Steel Co., explains his company's decision to install two converters by saying they would cost half as much as openhearths with the same output.

Referring to its two vessels at Aliquippa, Pa., Jones & Laughlin

### World Growth of Oxygen Steelmaking

L-D PROCESS		UNITS		ANNUAL CAPACITY		
COMPANY	LOCATION	No.	Capacity (Short Tons)	Now In Operation	In Operation In 1958	In Operation After 1958
Acme Steel Co.	Riverdale, III.	2	50			640,000
Jones & Laughlin Steel Corp.	Aliquippa, Pa.	2	65	750,000		
Kaiser Steel Corp.	Fontana, Calif.	3	65		1,440,000	
McLouth Steel Corp.	Trenton, Mich.	3	40	560,000		
		2	80			1,020,000
Algoma Steel Co.	Sault Ste. Marie, Canada	2	60			400,000
Dominion Foundries and	Hamilton, Ontario.	2	40	550,000		
Steel, Ltd.	Canada	1	60	400,000		
Vereinigte Oesterreichische	Linz, Austria	3	33	920,000		
Eisen- un Stahlwerke A.G.		3*	55			1,400,000
Oesterreichische-Alpine Montangesellschaft	Donawitz, Austria	2	28	460,000		
Gusstahlwerk Bochumer Verein A.G.	Bochum, West Germany	2	38	400,000		
Gusstahlwerk Witten A.G.	Witten, West Germany	1	20	187,000		
Koninklijke Nederlandsche Hoogovens en Stall- fabrieken, N.V.	Ijmuiden, Netherlands	2	66		330,000	
Hindustani Steel, Ltd.	Rourkela, India	3	44			825,000
Yawata Iron and Steel Co., Ltd.	Yawata, Japan	2	55		825,000	020,00
Nippon Kokan Kabushiki Kaisha	Kawasaki, Japan	3	44		825,000	
Acieries de Pompey	Meurthe et Moselle, France	2	17	experimental	020,000	
Altos Hornos de Vizcaya	Bilbao, Spain	2	40			275,00
Belgo Mineira	Minas Gerais, Brazil	2	33	420,000		
Usiminas	Minas Gerais, Brazil	2	50	,		640,00
Amagasaki Steel Works	Amagasaki, Japan	2	33			420,00
National Shipyards	Philippine Islands	1	33			250,00
Unknown	Near Black Sea—USSR	2	44	560,000		
KAL-DO PROCESS						
COMPANY	LOCATION	No.	(Short Tons)	Now In Operation	In Operation In 1958	In Operation After 195
Domnarfvet	Sweden	2	30	215,000		
	Sweden	2	100			500,00
GUTENHOFFNUNGSH OBERHAUSEN ROTO			Occasilla	New In	In Operation	In Operation
	LOCATION	No.	(Short Tons)	Now In Operation	In Operation In 1958	In Operatio After 195
Oberhausen	Germany	1	60	160,000		
		4	100	300,000		
Oberhausen	Germany	1	THU			

Steel Corp. places the capital investment at \$15 an ingot ton, as compared with an estimated \$40 a ton for added openhearth capacity. Actual investment was \$11 million.

Cost Comparison — Kaiser Engineers figures equipment costs this way: L-D oxygen furnace—\$13 to \$14 an annual ton; electric furnace—\$18 an annual ton; openhearth—\$33 an annual ton. Figures are based on a capacity of about 800,000 tons a year.

Kaiser does not take into account here oxygen plants for vessels or power stations for electric furnaces (a mill need not build either). The figures do not get into the complicated question of the investment required for iron supply. Oxygen furnaces operate with a maximum of about 30 pct scrap. At least 70 pct of the metallic charge is normally hot metal.

Hot Metal Needs — In recent peak periods, openhearth charges have averaged about half scrap and half hot metal. On this basis a brand new steel mill would need 20 pct less ironmaking capacity for openhearths than for the oxygen process.

Taking into consideration the extra coke oven and blast furnace capacity needed for oxygen steelmaking, Jones & Laughlin figures openhearths and oxygen vessels are a standoff if you start from scratch. For a completely new mill, including new blast furnaces, the overall investment would be the same with either process.

Case History—When basic oxygen vessels are added to existing plants, capital expenditures vary according to the iron supply. Algoma Steel has its own coal and ore mines, located close by. It was in a position to increase pig iron capacity at low cost through enlargement of blast furnaces and improvement of auxiliary equipment. Part of the existing iron supply could be diverted to converters by closing a marginal openhearth shop and

reducing the abnormally high hot metal charge of another shop.

For the mill that has the hot metal or can provide it at low cost, the oxygen process offers clear-cut capital savings. But a lack of existing iron does not rule out the process by any means.

Different Approaches—McLouth Steel and Kaiser Steel elected to install vessels even though the moves called for complete new blast furnaces. Acme Steel will get its iron from new hot blast cupolas.

Mr. Gillies of Acme says one of the reasons for Acme's move is that production costs are 25 pct less with converters than with openhearths. Kaiser Engineers feels the L-D process has an advantage of \$3 a ton under openhearths and \$5 a ton under electric furnaces in "cost above" (metallics).

No Overall Figures—According to Kaiser, the process offers labor and refractory savings while oxygen costs are more than offset by fuel charges for an openhearth or power for an electric furnace.

To date, no one has come out with overall cost figures. A comparison would have to be limited to a particular situation, taking into account the price of scrap, the amount of scrap used, fixed charges and the accounting charge for hot metal.

### Background

Of the 59 oxygen vessels now operating or in the works, all but eight are of the L-D type. Of these eight, four are the Kaldo type, which employs a rotating vessel (up to 30 rpm). The Kaldo converters were designed by Prof. Bo. Kalling. They are operated by Stora Kopparberg Corp. in Domnarfvet, Sweden.

Africa Signs Up—Another type of rotary converter has been designed by GHH in Germany. Two of these are now operating in Germany. Two more are due for operation in South Africa. Rotation speed of the GHH vessels is about 1 rpm.

The McLouth Steel converters

have yet to be legally classified. To date, Acme Steel has not indicated that it will operate under a licensing arrangement.

Origin of L-D—All the remaining converters are the L-D type (Linser-Dusenverfahren), first operated in Linz and Donawitz, Austria. L-D converters are stationary during blowing.

Kaiser Engineers is the licensee for the L-D process in this country. Dominion Foundries and Steel, Ltd., holds the Canadian rights. Operating under subcontracts from Kaiser Engineers in some cases, Pennsylvania Engineering Corp., New Castle, Pa., has built all the oxygen vessels in the U. S.

Legal Squabble — Basic oxygen chronology in this country runs something like this: McLouth Steel began operating the first vessels in late 1954, shortly after Kaiser obtained licensing rights for the L-D process in May of that year.

Last summer McLouth brought a declaratory action, challenging the validity of Kaiser patents and their application to the McLouth installation. In quick order a patent on which Kaiser holds licensing rights was issued, which Kaiser considers highly significant. Then Kaiser countered with an infringement suit against McLouth. The matter is still months away from trial.

Royalty Charge—Jones & Laughlin decided to go along with Kaiser Engineers for the two vessels put into operation late last year. Kaiser Steel is doing the same. The royalty charge reportedly comes to less than 20¢ a ton, payable in lump sum or on a running basis.

### Operation

In the operation of L-D converters, high purity oxygen under a pressure of 80-150 psig plays vertically down on a bath of molten iron. The oxygen burns off phosphorus, carbon, silicon and manganese, forming steel at the rate of about 2 tons a minute.

In normal practice, blowing continues until carbon content has been brought down to about .05 pet. At this point there is a marked subsiding of flame intensity and reaction noise.

Changes Coming—After tapping, manganese and other elements are added in the ladle to obtain the specified analysis. One practice is to go past the desired carbon level, then make additions. A carbon content of .30 is about the maximum under this method.

This picture may change soon, as work progresses on the technique of catching the carbon coming down. Jones & Laughlin has already gone up to .50 pct carbon. Tests with L-D converters at Donawitz have produced steels up to 1.2 pct in carbon. Stora Kopparberg reports good success in controlling carbon at relatively high levels.

### Oxygen

The oxygen cost in the process comes to about 75¢ per ton of steel produced. It takes around 2000 cu ft of oxygen to produce a ton of steel. Oxygen costs 5¢-7¢ per 100 cu ft. It is blown at the rate of about 3000-4000 cfm.

If the converter process had been used in this country prior to 1949, the oxygen cost would have been about \$2 a ton of steel. The present relatively low figure reflects a sharp drop in the price of oxygen over the past 10 years.

Prices have dropped for two reasons. First, there has been a swing to on-site tonnage plants, which eliminate the high costs of making and hauling liquid oxygen in cylinders. Secondly, competition among oxygen suppliers has stiffened.

### **Output and Capacity**

Speed is a big element in basic oxygen economy. Vessels are making steel as fast as 70 tons an hour, or nearly double the output rate of the most modern openhearths. Work with larger heats may jump output to 80 or 90 tons an hour.

For its two 65-ton vessels, Jones & Laughlin is figuring on a tap-to-tap time of 37 minutes. That works out to 40 heats a day and 750,000 tons a year.

**Kaiser Plans** — Kaiser Steel is putting in three vessels of the same 65-ton size. Kaiser is rating its operation at 1.4 million tons or nearly double the Jones & Laughlin figure.

The difference is that Kaiser plans on operating two vessels and blowing alternately while the third is being relined.

Both the Jones & Laughlin and the Kaiser vessels have the physical capacity for heats larger than their rated tonnage. Jones & Laughlin has tapped 81-ton heats (charge weight of 90 tons). Going to this size, heat time increased by 10 minutes.

#### Outlook

All major steel mills are keeping close track of the oxygen steelmaking process. A number have obtained detailed cost estimates on the L-D process. One major mill is said to be quietly operating one eight-ton vessel on a test basis. Several steel foundries are interested in oxygen vessels as a means of meeting intermittent needs.

Armco Steel shapes up as one of the best candidates for the next basic oxygen installation. Armco has a new blast furnace at Ashland, Ky. It has said it will be adding steelmaking capacity at this site. Added finishing capacity will eventually make the addition a must.

The fact that vessels deliver steel in small batches at short intervals suggests a natural tie-in with continuous casting. Inland Steel's report on casting said heats of about 70 tons would be good for efficient operation. Present day vessels are right in this range.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

## **Aluminum**

Sharp competition among the large number of extruders has prompted drastic discounting.

While prices are pared, production costs are higher.

Independents say they will seek assistance in Washington. —By F. J. Starin.

 "Anyone who would pay list price for an aluminum extrusion today would give away money."

"If I were to bid for a contract to supply an aluminum extruded shape on book price, I might just as well save my time."

This is how two independent aluminum extruders view their current market.

Other Concessions—One of the primary producers, selling aluminum extrusions, concedes the almost universal discounting in today's market. And he goes further, "Sometimes to compete for an order we have to forget about extras—die charges, charges for special setup time—and even throw in special packaging."

A check of the market reveals that for the most common extrusion—solid 6063-T5, factor 25, in large orders—the going price is about 40.5¢ to 41¢ per lb. The list price is 49.5¢ per lb. There have been reports of isolated cases of sales as low as 38¢.

Since 1950, when these same extrusions sold for 43.5¢ per lb, the price has sagged about 6 pet. But raw materials costs have risen substantially. Major extruders doing their own alloying pay 44 pet more for pig aluminum. Smaller shops pay from 36 pet to 45 pet more for 6063 extrusion billets.

Will Ask For Help—As a result of the squeeze in profit margins, some of the independent extruders say they will ask for help from Washington. It is reported they will

## Extruders In a Profit Squeeze

seek some means to maintain a reasonable spread between the prices of pig, billet, and finished extrusions. It is understood that a brief setting forth their position is now being prepared.

Many of the independents say their backs are to the wall. Their case goes something like this: We have to buy our raw materials at a firm price. Then we must sell our extrusions in a fluctuating, sharply competitive market.

**Producers Are Unhappy**—The primary producers say they are just as unhappy about price cutting as anyone. But they say the independents started it, that all they are doing is meeting the competition.

Alcoa Vice President Donald Wilmot says, "In some (aluminum) products the price situation has reached the point where it might properly be described as demoralized." He refers to price cutting as "merely a momentary advantage" and calls it "destructive".

Basically, everyone agrees the reason for the situation is too much supply for demand. This is the case with many aluminum mill products in the current market, but extrusions are hardest hit because of the large number of people in the business.

Field Has Grown—Says one of the independents, "We can't hold a good customer today. As soon as his needs reach certain levels, he quits buying from us and puts in his own press. The next thing you know he is competing."

As recently as 1947 there were only three independent aluminum extruders. In June 1956, 107 were reported. Latest estimates place the total at slightly more than 200.

What's in store for the aluminum extrusion market is anybody's guess. One of the primary producers points out that it depends on extrusions' biggest market—build-

ing. He concedes that competition is still "really rugged," but sees some slight signs of improvement.

Slim Profit Margin — Many of the independents feel the market can't go any lower. A cross-section survey of independent extruders in 1956 showed net income after taxes averaged only about 2.2 pct of net sales. Almost 20 pct of the reporting companies operated at between a loss of 7 pct to profit of less than 1 pct. At the time published and market prices just about agreed, and production costs were lower.

Extrusions aren't the only aluminum mill product involved in the scramble. Cablemakers have their own war, with copper as well as with each other.

Cable Price Cutting—In common with extruding, making cables requires minimum experience and investment. When copper was flirting with 50¢ and in short supply, aluminum cable was in demand. Independents who entered the market then are really sweating it out now. A consensus of cablemakers and their best customers, the utilities, indicates market prices are from 10 pct to 25 pct below list prices, depending on the size of the order.

Some utilities, which got interested when copper was out of sight, have completely left the market. Even those who switched to aluminum completely for some uses say they are ordering very little.

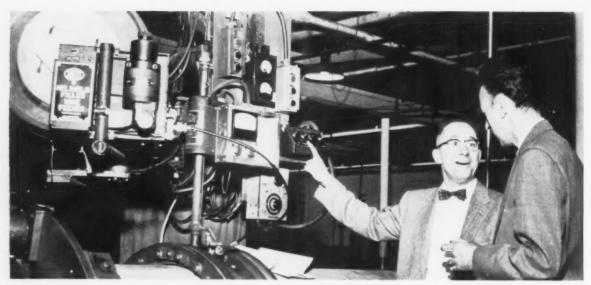
While extrusion selling is discounted from book prices that haven't officially been changed since the across-the-board aluminum hike in August 1957, many wire and cable prices date only from October 1957, when some were dropped as much as 15 pct.



### **Competition Squeezes Extrusion Prices**

CEN	ITS PER L	В,	Curr	Current		Change 0–58
	Oct. 9 1950	Aug. 4 1955	List Price	Open Market	List Price	Open Market
Solid Extrusion (6063-T5)	43.5¢	43.4∉	49.5€	40.5¢ 41¢	+14	-6
Extrusion Billet (6063)	20.94	26.7¢	28.5¢ to 30.4¢		+36 to	
Pig	18∉	22.5¢	26¢		+44	

Price of extrusion based on 30,000 lb, factor 25, weight 1/10 lb per ft-



RESULTS: Kaiser engineers discuss outgrowth of production analysis, a new welding control.

## "Crash" Preplanning Pays Off

Missile component maker puts team of specialists to work developing new, better ideas.

Program provides running start on production, aids suppliers.—By P. J. Cathey.

■ Start planning today to meet tomorrow's production needs. That's an important part of the philosophy the Fleetwings Division of Kaiser Metal Products, Inc., Bristol, Pa., is putting successfully to work in manufacturing missile components.

Fleetwings—which is fabricating fuel tanks for missiles—is so sold on this approach to the refinement of production planning that it is being incorporated in all the firm's missile and aircraft work.

How It Started — When Fleetwings started production on a contract with the Pilotless Aircraft Div. of Boeing Airplane Co. a year and a half ago it gathered a group of production specialists and engineers and freed them from all regular duties.

Their assignment: Look into all the new developments in the missile component manufacturing field. Check out any tools or methods in other fields that might be applied. Investigate all new products and techniques for their potential usefulness without immediate consideration of cost or availability.

Full-time Job—These production specialists—they included an industrial engineer, a plant layout man, a product engineer, a tool designer and a cost estimator—devoted all their time to the job. They dug into trade and technical journals. They talked over their problems with the salesmen and engineers of their customers and suppliers. They studied the existing production methods at Kaiser, always keeping an open mind for better, faster ways to do the job.

"The most important thing we do," says Engineer Herb Frick, who's in charge of the group, "is divorce ourselves from preoccupation with day - to - day problems. Others are solving them."

The Positive Approach — "We wanted to get as far away as we could from the idea that 'you can't do it—because it hasn't been done

before—because it costs too much, because it hasn't been proved'," Frick adds. "Our responsibility was finding the ideal way to get the job done and then working to apply it."

As Fleetwings turned out fuel tanks for the prototype and preproduction models of missile fuel tanks, thinking was always geared toward techniques that would be required when full-scale production began.

It Worked—What are the results of the studies? Fleetwings has found they enable the firm to "grow up" with the jobs. Manufacturing ideas developed in the early stages of production were ready for "phasing in" into the production line at predetermined effectivity points; and, further improvements were developed as production progressed.

While studying welding techniques and equipment, Fleetwings engineers interested an equipment supplier in a new type of set-up which was worked out in a miniature model.

Suppliers Benefit—Frequently the vendors benefitted as much from the probing as Fleetwings did. When

existing products proved inadequate the suppliers were set off on profitable development and improvement plans of their own.

"The work of 'phasing in' the manufacturing improvements." says E. J. Raymond, Fleetwings contracts manager, "requires careful timing. They must be introduced without upsetting existing production schedules. When it's decided, for instance, to redesign one tool it usually means a whole 'family' of related tools must be modified also. These family groups must be phased into the production line as a unit."

Search Goes On—When the refinement of production planning is over the group isn't ready to shut up shop. They go right on with further investigations and the results of these efforts, too, will be woven into manufacturing operations in the future.

## Expansion Project Will Close J&L Plant

Jones & Laughlin Steel Corp. has virtually stopped normal operations at its Cleveland plant to complete a modernization and expansion program.

When the plant is rolling full tilt again, probably some time in April, cold rolled sheet capacity will have been doubled. J. R. Powell, works manager, says the updated plant will be "one of the major flat rolled steel facilities in the world."

**Gradual Shutdown**—First to be affected by the shutdown will be blast furnaces and steelmaking furnaces.

New Equipment — Primary reason for the shutdown is to install a new roughing mill. Also included in the project are a new ore sintering plant, new soaking pits, new blooming mill, new continuous pickling line along with a fourstand, tandem cold reducing mill, annealing facilities, temper mill, hot and cold shear lines.

The overall two-year Cleveland modernization cost the company over \$82 million.

## Forecast: Business Upturn in Fall

Cleveland economist makes predictions at industrial heating association meeting.

The current pattern is similar to 1949 and 1954 recessions, he points out.

The current recession, which began about last Labor Day, should be over by next Labor Day, according to James M. Dawson, vice president and chief economist, National City Bank of Cleveland.

He made this prediction at the annual winter meeting of the Industrial Heating Equipment Assn. in Pittsburgh. For the record, Mr. Dawson has been correct in his forecasts for nine years and nine months out of the past 10 years.

Opinion Is Shared—He predicted the 1958 Gross National Product, which began the year at a \$430billion-a-year rate, would wind up at a \$444-billion-a-year clip. Total for the year, he says, will be about \$435 billion.

Mr. Dawson's relative optimism was shared by most IHEA members, who make three-fourths of the nation's heat treating and melting furnaces and more than half of the induction units. Few members indicated they were surprised by the downturn. Most said they were pushing research and development work harder than ever.

Olmstead Elected—At the meeting, C. F. Olmstead, president of Lee Wilson Engineering Co., was elected IHEA president for 1958. R. L. Harper, executive vice president of Harper Electric Furnace Co., was elected vice president.

Mr. Dawson laid last fall's sudden drop in the Federal Reserve Index to three factors. First was a cutback in defense spending followed by a drop in plant and equipment spending. These were too high for conditions, so a liquidation spree began.

Consumers' Role — The patterns of the 1949 and 1954 recessions were almost identical in shape and each lasted about a year. If the current recession repeats, Mr. Dawson said, it should bottom between May and August of this year. And it should start up—more sharply than before—in September.

Reason for the sharper upturn, said the Cleveland economist, is that consumer spending brought us out of both previous recessions—despite the fact that government spending was declining in each case.

This year he expects consumer spending to repeat previous patterns.



C. F. OLMSTEAD: Elected president, Industrial Heating Equipment Assn. for the coming year.



**FAMILIAR SCENE:** While top labor negotiator for "Big Steel," John Stephens acted out the signing of a contract with steel labor many times. He's out of the spotlight now.

## Stephens Steps Down

■ John A. Stephens, top labor negotiator for U. S. Steel Corp., since 1943, is stepping into the background — at his own request. Mr. Stephens assumed an advisory vice presidency on Feb. 1.

Mr. Stephen's experience with U. S. Steel goes back to 1934, three years before the company abandoned its traditional "open shop" labor policy and signed its first contract with the Steel Workers Organization Committee, predecessor of the United Steel Workers of America.

Hectic Experiences — The softspoken Mr. Stephens lived through many a hectic experience during these years, particularly since he stepped into the toughest spot of them all in 1943—vice president industrial relations — for "Big Steel"

At one time there was talk that Mr. Stephens might be persuaded to take over as top negotiator for the entire steel industry in a role similar to that played by the late Harry Moses in coal labor. But he told The IRON AGE several months ago that he wasn't interested.

Clifford F. Hood, U. S. Steel president, said Mr. Stephens had asked to be relieved of administrative responsibilities.

Likely Successor? — George M. Thursby, vice president, industrial relations-administration for U.S. Steel, is reportedly the most likely to succeed Mr. Stephens. Mr. Thursby's early industrial and labor experience was in coal (H. C. Frick Coke Co.). He was named to his present job in 1953. While with H. C. Frick, Mr. Thursby worked in the shadow of Mr. Moses, who advocated quiet man-to-man negotiations with John L. Lewis, head of the United Mine Workers. Both Moses and Lewis shunned publicity until a contract had been negotiated.

### Pittsburgh C & C Makes Ferromanganese

Pittsburgh Coke & Chemical Co. became the second independent blast furnace producer of manganese when it pulled the switch for the first production run on a converted ferromanganese furnace, near Pittsburgh, last week.

The furnace has a daily capacity of 400 tons of ferromanganese or 600 tons of spiegeleisen. It is the second largest in the United States for ferroalloy production. It will turn out a high carbon product, having 74-82 pct manganese.

Most From Blast Furnaces— Ferromanganese is used mostly for cleansing and alloying in steelmaking. About three-quarters of the total is produced in blast furnaces. The remaining 25 pct is produced in electric furnaces and is mostly the low carbon and medium carbon type.

Explaining its move into the field, the Pittsburgh company gave these reasons:

- Growth of ferromanganese is assured by the growing need for steel. Fifteen pounds of ferromanganese are consumed for every ton of steel made.
- 2. With only one non-captive competitor (E. J. Laveno & Co.), Pittsburgh Coke feels it will have a shot at a nationwide market.
- 3. Addition of ferromanganese will raise the company's price average significantly. Pig iron sells for about \$66 a ton; ferromanganese for \$274 a ton.

### Kaiser Slows Down

Kaiser Steel Corp. will finish the expansion project it started at its Fontana, Calif., plant, but at a greatly reduced rate.

Rescheduled, with reduced crews, are 90 new coke ovens, a fourth blast furnace, three new oxygen steelmaking furnaces, and a new universal slabbing mill.

Finishing facilities will be completed on schedule.

## Slowdown Hurt '57 Steel Profits

### But Industry Leaders See It Leveling Off

No rapid pickup, but a gradual improvement is predicted by spokesmen for the major steel-makers.

Despite murky going in last half of 1957, some companies made earnings records.

■ Is the downturn in steel business leveling off?

Some industry leaders believe so. As they reviewed 1957 sales and earnings they cast an optimistic, but cautious glance ahead.

"We noticed in the last week or so," Roger M. Blough, U. S. Steel board chairman, declared, "that steel orders were not declining—if anything, they were leveling out and in some quarters were moving upward."

Bottomed Out?—Mr. Blough was one of those who did not expect an overnight improvement. While he believes that the current decline will "start to round out at this bottom very soon, nobody should expect a rapid change in the situation or a rapid increase in steel operations."

Arthur B. Homer, president of Bethlehem Steel, was another detecting some cause for encouragement. Forecasting an increase of "maybe 5 points" in the steel industry's operating rate in March and a gradual rise after that, he added, "There are signs that the recent downtrend is leveling off and may begin to turn upward."

Reasons for Hope—The industry will come back so hard, Mr. Homer believes, that "we're going to be scrambling, because everybody will be saying his inventories are too low."

Noting that heavy inventory liquidations slowed last half and es-

pecially last quarter steelmaking operations, C. M. White, chairman of Republic Steel Corp., stated, "Operations so far in 1958 continue at about the same level as in the latter part of 1957. We expect, however, that business will improve as the year progresses and operations later in the year will be at a considerably higher rate."

"We are hopeful," said Inland Steel President Joseph L. Block, "that steel demand will turn upward in the second or third quarter as a result of completion of the current inventory liquidation, lower money rates, the stepped-up defense program, and generally healthy business conditions."

Not Many Equal '56—The effect of customer inventory liquidation is clearly evident in the 1957 profits of steel companies. Two of the "Big Three"—U. S. Steel and Bethlehem — bettered 1956 earnings. The third — Republic — fell short of '56 figures by about 5

million. Most other producers dropped below 1956 earnings last year, exceptions being Jones & Laughlin and Inland Steel.

Here are some highlights from earnings reports by companies:

U. S. Steel: Achieved record sales of \$4.4 billion and record net earnings of \$419 million, bettering net earnings high of \$370 million in '55.

Bethlehem Steel: Set three records, in net income, \$191 million topping the \$180.1 million in 1955, in production, 19.1 million ingot tons, contrasted with 18.3 million in 1956, and in billings, \$2.6 billion.

Republic Steel: Had net earnings, \$85.1 million, and net income per share of stock which were the third best in the company's history, exceeded only by 1955 and 1956.

Jones & Laughlin: Registered its second best income, \$45.4 million. Established a new company record for total sales of \$837.5 million.

### Steel Earnings—1957 versus 1956

			1957
	1957	1956	Fourth
COMPANY	Earnings	Earnings	Quarter
U. S. Steel	\$419,073,722	\$348,098,916	\$ 90,096,731
Bethlehem Steel	191,025,933	161,411,625	47,273,306
Republic Steel	85,014,422	90,406,665	11,975,000†
Jones & Laughlin	45,452,000	45,122,000	7,482,000
National Steel	45,518,884	52,502,422	11,368,963
Youngstown Sheet & Tube	42,508,579	43,174,587	10,695,000+
Inland	58,876,875	52,998,726	
Wheeling	12,078,000	17,672,000	2,971,000
Pittsburgh Steel	4,155,000	6,225,000	(125,372)*
Granite City	9,984,000	15,109,000	
Alan Wood	2,054,000	3,096,000	
Armco	55,044,000	65,593,182	10,240,000
Copperweld	2,769,855	4,106,039	622,830
Kaiser Steel	21,499,000	23,572,000	3,085,000

\* Indicates loss.

† Iron Age Estimate.

## How Buyers See the 2nd Quarter

### Purchases May Pull Out of Nose Dive

A majority of purchasing agents feel that spring buying will hold at present levels.

Many hopefully predict a turn for the better by the end of the year.

 Don't look for purchasing agents to loosen their purse strings in the second quarter. They're still on an economy kick.

A sampling of buyer opinions in the East and Midwest indicate a majority of metalworking companies do not plan to increase spending between April and June. The comment most often heard was: "We expect our purchases to hold steady in the second quarter."

In most cases, purchasing agents

estimated that their buying volume in the first quarter was down 20 pct from a year ago.

Some Replies—"We've cut back further than we had to in the first quarter," says the buyer for a large consumer of alloy steel bars, "so even if our production falls off 10 to 12 pct in the second quarter we can continue buying at our present rate without getting overstocked."

One light stamping company that was hit hard with a 50 pet cut in production during the past year is banking on a jet engine order to boost its activity about 10 pet in the near future.

Says the purchasing agent for a medium-sized steel company: "Our own operations have been running fairly high during the first quarter, unlike the general industry pattern. But we are pessimistic about the second quarter. Naturally, we're approaching it with caution as far as our buying policies go."

**No Hedging** — Buyers declare they'll buy no extra inventory in anticipation of steel price increase next summer.

Even the planned cuts still to come boil down to removal of "dogs" from plant inventory—steel that never moves rapidly and which the buyer over-inventoried when the grade was hard to get.

Plate and structurals are most frequently mentioned in this respect. These were the last grades to be hit by an inventory reduction. They figure heavily in most consumer plans for further first quarter inventory reductions.

Optimism Sprouts—Buyers who last summer were banking on a 1957 year-end business pickup which never materialized are again hopefully eyeing the end of 1958. "A definite thread of optimism" is noted by the National Assn. of Purchasing Agents among its members.

"A significant number of our reporting members believe we are at or near the bottom," NAPA reports,

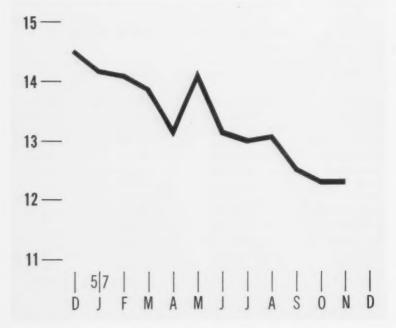
Selective Buying—With all materials readily available, the law of supply and demand is in full operation and prices are more competitive than they have been in years, the association comments, adding:

"Alert buyers report that a careful market review of individual items is paying real dividends. Overall, 11 pct of our members say their prices are up; 8 pct the same, and 9 pct report reductions."

In the months to come, purchasing agents will be trimming material requisitions before writing out their purchase orders.

### How Long Will P. A.'s Sit Tight?

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Henry J. Caul, district sales manager in the Northeast area. 37 years with Bound Brook.

James H. Hodgkins, district sales manager in the Chicago area. 16 years with Bound Brook.



J. J. Scott, district sales manager in the Detroit area. 21 years with



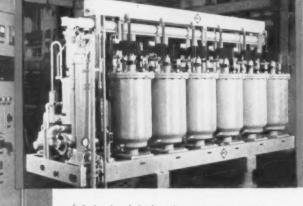
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Mercury Arc
Rectifiers

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- Fixed excitation anode does not contact mercury — is independent of level, turbulence or impurities.
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- Arc-over-free tube eliminates arc-over danger by insulating entire arc path.
- Enameled anode seals provide high strength, trouble-free seal.

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**ALLIS-CHALMERS** 



A-556

### **Awarded Silver Quill**



HONORED: Benjamin F. Fairless accepts the National Business Publications' "Silver Quill" award from Vice President Richard Nixon. The award is made annually for outstanding contribution to the U. S. economy.

## Mallory-Sharon Expands and Integrates

Mallory-Sharon Metals Corp. joined the ranks of fully integrated titanium producers, and at the same time became the only fully integrated zirconium producer.

National Distillers and Chemical Corp. joined the firm as a one-third partner, bringing with it its sodiumprocess titanium and zirconium production plants and laboratories at Ashtabula, O.

The Biggest — The addition of National Distillers also makes Mallory-Sharon the largest company in the special metals field, with assets over \$55 million.

Previous facilities of Mallory-Sharon, jointly owned by P. R. Mallory, Indianapolis, and Sharon Steel Co., Sharon, Pa., include titanium melting, rolling, research and quality control facilities at Niles, O.

Reactive Metals, Inc., previously jointly owned by Malloy-Sharon and

National Distillers becomes a wholly owned subsidiary of Mallory-Sharon Metals. Mallory Sharon's capacity now is about 5 million lb of titanium and 2 million lb of zirconium annually.

Expect Sales Hike—"Sales for 1958 should be ahead of 1957 with broadening of our product line to include zirconium, hafnium and other new metals required for the missile and nuclear age," said Frank Vandenburgh, new president and chief executive officer of the firm. "The industry in 1958 should sell as much as 1956 but not equal to 1957," he added.

Industry output is currently running only about 25 pct of 1957, but should end up 50 to 75 pct ahead of last year.

Others in the new line-up at Mallory-Sharon: former president James A. Roemer becomes board chairman; James E. Brady, secretary-treasurer, and M. K. Huber, assistant secretary.

### J&L Makes Land Buy

Jones & Laughlin Steel Corp. has bought about 300 acres in Wisconsin, and leased an additional 1720 acres as part of the firm's iron ore reserve program.

J&L says they have no immediate plans for development of the acreage, located in Iron and Ashland Counties.

Exploratory studies indicate, however, the presence of commercially economical quantities of taconite which could be recovered by open pit mining.

### **Special Prices Ruling**

Manufacturers now have U. S. Supreme Court backing on their right to reduce prices to some — not all—customers in a given area.

Producers may in good faith cut prices to certain customers to meet competing prices, the court decided. The ruling specifically concerns pricing by Standard Oil Co. of Indiana. But the effect may be felt in the steel or metalworking industries, too.

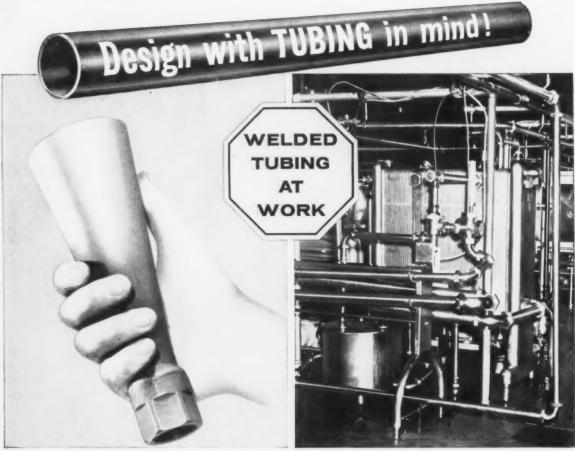
How It Works—A supplier of metal products might trim his prices to jobbers in an area. His competitors, vying for the business, can offer similar reductions to just those customers who are the targets of competition, not all buyers in the area.

The 5-to-4 decision ends the 17year-old Standard case. But it may prompt early action by Congress on a bill to do away with the good faith defense for price cutting.

### Equipment to Venezuela

Westinghouse Electric International Co. has received a \$3 million order for electrical equipment to be used in three rolling mills of Venezuela's first integrated steel mill.

Included in the sale are sixteen motors which will deliver 19,300 hp for the \$343 million Orinoco Steel Mill, now being built near Puerto Ordaz.



Once machined from solid bar stock, this machine gun flash hider was produced at a 92% saving in cost by forming from Welded Carbon Steel Tubing.

Positive sanitation, non-contaminating, non-corrosive, non-breakable—all these call for Welded Stainless Steel Tubing in hundreds of Pasteurizers like these and all sanitary services.

### Reduce fabricating costs—Insure purity

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or gases, or move at high RPM—there is a grade, size and shape of Welded Tubing that will do your job best. For all tubing applications, consult a quality tube producer.

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### Mark W. Cresap, Jr.

## ATop Man Who Keeps in Touch

Two-way communications is vital for a growing company, says Westinghouse president.

His personal appearances are having effect on the company's far-flung empire.

• Next to earning profits for his company, Mark Winfield Cresap, Jr., new president of Westinghouse Electric Corp., believes his most important job is "to make sure people in the organization are aware of what we are trying to do."

In a corporation as big as Westinghouse, there's a long way between top management and the first levels of supervisors, he points out. And it's vital that all supervisors have maximum personal identification with top management efforts.

On the Go—"To me, this is an absolute necessity to good sustained corporate performance," explains Mr. Cresap (rhymes with dress-up), who at 47 is one of the youngest presidents of a major U. S. industrial firm.

During the past three years, as executive vice president, he has traveled throughout Westinghouse's diversified empire, carrying out his communications mission. His companion and fellow communicator on these tours has been John K. Hodnette, who succeeds Mr. Cresap as executive vice president.

Between June and November last year, the two men flew 15,000 miles, attended 50 meetings with 8500 members of management. They expect to repeat the gruelling schedule again this year.

Criticism Invited — Mr. Cresap describes these meetings as one of the most rewarding tasks he performs: "We want new ideas, chal-



MARK W. CRESAP: "We want differences of opinion."

lenges to old ideas and, above all, differences of opinion. Without these there would be no progress."

In a typical plant visit, the two men will first meet with the general manager and his staff, take a threehour tour of the plant, and meet supervisors and union stewards on the job.

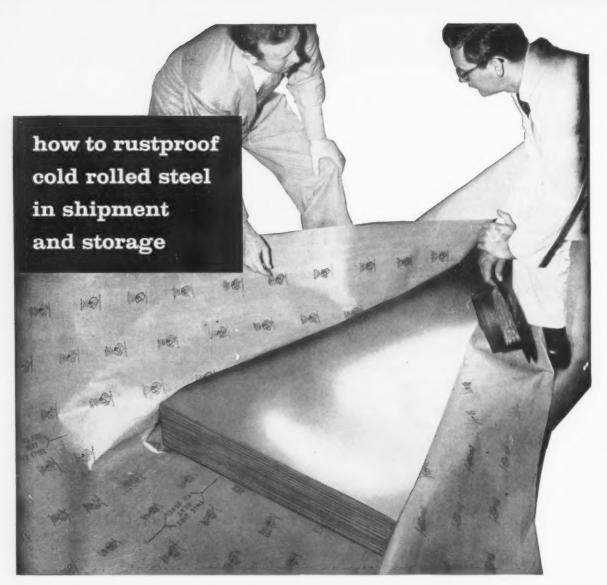
After lunch in the cafeteria, Cresap and Hodnette speak for 15 minutes. This is followed by an hour and a half question and answer period. Before they arrive questions are submitted anonymously to the division manager.

Learns Young—The Cresap confabs are credited with greatly improving liaison between Westinghouse headquarters in Pittsburgh and the 101 plants and 127,000 employees scattered throughout the hemisphere.

Mr. Cresap's eventful life began in Kenilworth, Ill., near Chicago.

After graduating from Williams College and Harvard Business School, he got his start with a Chicago management consultant firm. Five years later he was merchandising manager for the John B. Stetson Co. He entered the Army in 1941 and emerged a colonel.

After the war, he and two wartime buddies formed a management consultant firm in New York. It was at this point in 1951, that he was lured into the Westinghouse fold by G. A. Price, board chairman.



Proved by actual test! Unwrapped steel rusted within a few hours. Identical steel wrapped in Ferro-Pak showed no signs of rust . . . even after several months. Non-toxic chemical vapors from Ferro-Pak coat the steel with an invisible film that makes it impossible for rust to get the slightest foothold.

Even under adverse conditions, such as outside storing or shipping, Ferro-Pak provides complete protection. It is waterproof, strong,

yet highly flexible and easy to handle. The chemical rust inhibitor is compatible with oil and stays effective for long periods even when the humidity soars.

Whether you're a shipper or a buyer of steel, it will pay you to specify Ferro-Pak wrapping wherever rust is a problem. For an interesting idea brochure on many uses for Ferro-Pak, write Cromwell Paper Company, 4803 South Whipple Street, Chicago 32, Illinois.



How to rustproof a freight car—Ferro-Pak is used to line sides of car and to interieeve colls, transforming ordinary reight car into huge rustproof package.



How to rust proof black plate... On this light gauge, dry, uncoded steel, rust can start from a lingerpoint. Femo Pak keeps black plate rust-free even when the humidity soars!



# Is Business Drop Leveling Out?

About the best you can expect before summer is an easing in the rate of business decline.

Lack of apparent encouraging trends makes business see the dark side. There are a few hopeful factors.

 There are a few straws in the wind for business to grasp at hopefully, but about the best you can hope for this month is a slowing of the downtrend.

That, in itself, is not a small thing. The Federal Reserve Board's Index of Industrial Production has been dropping at the rate of two points or more a month since last September. This is about as fast as the downslide of late 1953 and early '54, which the present situation seems to parallel. A drop in rate of decline now would be very significant.

Cycle Repeating — If the cycle should repeat itself, business will start leveling in the summer. It will start a significant upturn in the late months of the year, although probably later than previously predicted.

What makes business more pessimistic than it should be is the absence of any real indicators that point to a sharp upturn. There are some minor ones, but they don't indicate an upward trend in general business as yet.

Hope from Housing—The most significant is the very slow, but persistent, reversal of the new home-building slide. This is far from a boom, and it may not materialize into one. If it continues, it can have a good effect on construction materials, appliances, and the other products that go into new households.

If you look closely at the business

news, some of the long-awaited defense business is starting to materialize. There is still no indication that the defense spending for missiles will generate a metal-working boom in itself. Nevertheless, contracts are starting to be issued and will have a strong effect in stimulating business later on in the year.

No Change in Production—Most companies are planning no change in their production levels for the immediate future. This means that there will be no over-producing in the next few months. If anything, business is not producing up to the rate of consumption.

In this tremendous period of inventory control, production rates in many industries now lag behind consumption. Steel may be the leading example in this case, but it is not alone. Sooner or later, this will result in depleted stocks and a spirited revival of buying.

An important thing to remember is that there is no panic. Most individual companies, even among those most hard hit by present adverse conditions, are in good financial shape. They will be in a position to buy new goods and materials as soon as the demand materializes. There will be no delay in spending plans when the uptrend starts.

#### Price Squeeze on in Full Force

**Squeeze Is On**—Your company probably is in a price squeeze now. You can expect price pressures to intensify in the months ahead.

In fact, prices will be one of management's most critical problems as competition stiffens. It probably won't be reflected much in list or base prices, but price cutting will be more the rule than the exception.

Some Down Already—Even before the end of 1957, some price indexes reflected the impact of competition. Automobiles, for example, were bringing significantly less than immediately after new model announcement.

Unfortunately, the old law of supply and demand has been repealed to a large extent. At least as far as management's latitude to seek out a price at which his product will move and set it there.

Costs Still Go Up—Today, management is stuck with a wage escalator, inevitably climbing costs of capital goods, higher freight rates, higher taxes, and any number of cost factors that continue on the upgrade in spite of a business recession.

It has become almost impossible for a manufacturer to cut his costs other than by manufacturing methods, greater efficiency and improved productivity. You probably are as far as you can go in this direction, or at least feel you are.

Close Scrutiny—But competition will get tighter before it eases. While the pressure is on, your price policies will be under close scrutiny, by your customers and your competition.

Some basic products are yielding (see p. 58) in spite of most determined efforts to hold the line. For the most part, in the nonvolatile products and materials, you can look for cuts in the form of discounts, freight concessions, and other places where they do not show up on the list price. But the bargaining and price shaving will be there.

## **Automotive Expands Plastics Use**

#### But Industry's Search For New Applications Continues

There is little probability that plastics will ever replace steel.

But they do have many supplemental uses in automaking and tooling.—By H. R. Neal.

■ Some 52 million lb of plastics were used in General Motors cars in 1957—with more plastics to be designed into future cars, according to a GM engineering executive. At the same time, he emphasized steel will continue as the primary building material.

Charles A. Chayne, GM vice president in charge of Engineering Staff, made his observations at the Society of Plastics Engineers' 14th annual technical conference. Small but Growing—On a lb-per-car basis, he said, only 15.4 lbs of plastics are found in a standard 1957 four-door sedan. This is less than one-half pct of the car's total weight. But, Mr. Chayne pointed out, this is more than a 40 pct increase over 1955 cars. And it's a 400 pct increase over the 3.84 lb of plastics used in the average four-door sedan of 14 yrs ago.

Explaining why plastics wouldn't replace steel, he pointed out "with more structure designed into less space, stiffness of body structure gains in engineering importance and steel predominates as the ideal building material."

Other Needs-But he listed other

needs for plastics in the auto industry. Among them are:

Adhesives—"It would be helpful if metal trim parts could be cemented to the car to replace the wide variety of fastening clips and accurate hole cutting in body panels."

Protective coatings—for exterior bright parts subject to corrosive conditions.

Glass—"The large and compounded curved glass windows in today's automobiles present serious handling problems in production and costly replacement in the field."

Seals—"Rubber oil seals present some problem today as a result of the oil industry's constant improvement in oil by the addition of new additives."

For Tooling — "Thermo-setting plastic laminates and printed circuitry offer much promise. In general terms, car manufacturers are seeking plastics with higher strength, better cold-flow properties and low cost," he said.

Mr. Chayne also forecast increased use of plastics as a tooling material. "The value of . . . plastics for tooling is evidenced by faster tool fabrication, lower tool costs, lighter weight tools and easier modification of tools which become involved in engineering changes," he said.

Time Saver — He hinted that time-savings advantages for plastic tooling are becoming increasingly important. It is no secret that automakers have made some expensive last minute styling changes in recent years to stay abreast of their competitors.

"Complete tooling programs in plastic can be completed in 1/3 to

#### **Two-Car Patrol Chases Noisemakers**



QUIETNESS QUEST: General Motors engineers use a two-car team for tracking down noises inside a moving car. Microphones planted in the test car are connected by cable to recording equipment in a following car.

#### Missing Something?



The Answer is Pink!



# Switch to PINK CIMCOOL

If you'd really like to be on the ball and improve your score in the cost department, then you too, should switch to CIMCOOL° S2 Concentrate. You can't miss, for CIMCOOL is actually the largest selling chemical cutting fluid in the world. And, with good reason.

**CIMCOOL LOWERS COSTS** because it's longer lasting in machines. Therefore, it reduces downtime and cuts labor costs for cleaning and changing.

CIMCOOL PERMITS FASTER SPEEDS and feeds, because of its chemical lubricity. It combines friction reduction and cooling capacity in a degree never before attained by old fashioned lubricants.

CIMCOOL IS CLEANER TO USE because it doesn't soil hands or clothing. It contains no skin irritants. And it's safer because it leaves no slippery film on shoes, floor, machine or work. It can't smoke, can't burn, and virtually eliminates rancidity and foul odors.

Three good reasons why you should switch to Cimcool. We know Cimcool Concentrate will keep you out of

the rough every day in your plant. So call your Cimcool Distributor today. He'll be glad to give you full information on all the advantages of Cimcool Concentrate—as well as details on the entire family of Cimcool Cutting Fluids.

Or contact us direct and we'll have one of our Cincinnati Milling trained machinists call on you—without cost or obligation, of course. Write, wire, or telephone, Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio,

#### CIMCOOL CUTTING FLUIDS

CIMCOOL **52 Concentrate**—The famous pink fluid which still covers 85% of all metal cutting jobs. Effective, economical and clean.

CIMPLUS—The transparent grinding fluid with exceptional rust control. Also used for machining cast iron and as a water conditioner with CIMCOOL Concentrate.

CIMCUT Concentrates (AA, NC, 55)—For jobs requiring oilbase cutting fluids. Added to mineral oils, they give economical mixes for higher speeds and feeds.

CIMCOOL Tapping Compound—Permits the use of highest tapping speeds and increases tap life amazingly.

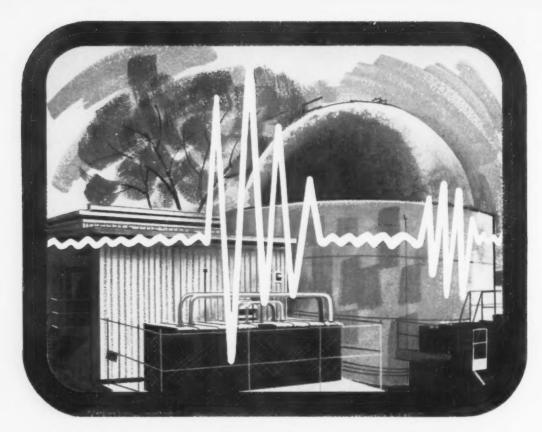
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HAS O.K.'d MORE THAN TEN MILLION FEET OF STAINLESS STEEL NUCLEAR REACTOR TUBING!

More than 1,800 miles of stainless steel reactor tubing have been tested ultrasonically. At one tube plant alone, Sperry engineers have inspected more than 1,000,000 feet. Its accuracy and reliability are such that ultrasonic inspection is now a standard specification for all reactor tubing.

#### SAFETY OF CAR DRIVE SHAFTS INSURED BY REFLECTOSCOPE INSPECTION

Welded steel tubing for automobile drive shafts is inspected for soundness of the weld by Sperry Ultrasonic Reflectoscopes with RA attachments. These units scan material traveling at high production speeds, monitoring and recording the weld quality and signaling any deviation from predetermined standards. Automatic marking devices and alarm signals provide a double check on the safety factor.

Equally efficient in contact or immersion use, the Sperry Ultrasonic Reflectoscope provides a simple, nondestructive and economical way to locate internal defects in materials. Its versatility, indicated by the two examples of tubing inspection, has been proved in thousands of other applications ranging through quality control, periodic maintenance, laboratory investigations, etc.



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		ADDRESS		
Park in Ultrasonic Inspection		CITY	ZONE	STATE

#### **Automotive Production**

	WEEK EN	DING	CARS	TRUCKS
	Feb. I.	1958	109,234	18,673
	Feb. 2,	1957	140,411	22,953
	Jan. 25,	1958	107,495	18,245
	Jan. 26,	1957	145,191	23,138
	TO DATE	1958	494,242	81,282
	TO DATE	1957	669,708	98,496
*Preliminary		гу	Source: Ward's	Reports

1/2 the time required to produce an identical program of conventional tooling," he said. "Many forming dies can be made with plastic in a matter of days, in contrast with weeks and months required to produce their conventional counterparts.

Mr. Chayne then predicted: "The constant search for new materials and new applications is destined to become an entirely new era with respect to production tooling."

#### **Auto Wiring Doubles**

Buick chief engineer Oliver K. Kelley reports automotive electrical systems have nearly doubled in size and capacity in the last 12 years. Some cars now use more wire and electric light bulbs than the average home.

For example: the 1958 Buick uses nearly two miles of wiring. About a mile of wire was used in 1947. In addition, as many as 34 light bulbs and a dozen electric motors are used in some 1958 models. The average 1946 car had only a few lights and one or two electric motors.

#### AMC Finally in The Black

At long last, one of the independent automakers has turned the corner and appears headed for a profitable year. American Motors reported a net profit of \$4,948,736 in its first fiscal quarter ended Dec. 31, 1957. This is well in excess of the \$3 million estimate made early in December by AMC president George Romney. The profit com-

pares with a loss of \$2,994,613 in the same period a year ago.

Mr. Romney was cautious in predicting how the company would fare over the entire year. "The showing for the year as a whole is not expected to be maintained at the same rate as the initial fiscal quarter," he said.

Sales Up 35 Pct—"The fourth quarter customarily absorbs heavy expenses incident to vacation schedules, inventory taking, new model changeover and other charges. However, a substantial profit for the year is anticipated."

Retail sales of AMC cars totaled 35,668 units in the 3-month period, up 35 pct from 26,327 in the year ago quarter. Production was up 48 pct to 41,492 units from 28,021 the previous year.

#### **Chrysler Missiles**

Chrysler Corp. has formed a Missile Div. to be responsible for the firm's participation in development, engineering and production in Redstone and Jupiter programs. The

announcement was made by T. F. Morrow, vice president and group executive-defense and special products.

Chrysler was awarded a new \$52 million contract for the production of Redstone and Jupiter missiles a month ago.

Irving J. Minett has been named group executive in charge of the new division, and will continue to direct the Defense Operations Div. C. Allan Brady is general manager of the new division.

#### Idea Plans Grow

Employee suggestion plans paid off in big numbers during the past year.

Ford Motor Co. employees received \$887,062 during 1957 for their ideas. Buick workers fattened their pay envelopes with an extra \$196,846 under the GM Suggestion Plan.

Of 64,077 acceptable suggestions submitted to Ford during 1957, more than 13,000 received cash awards averaging \$66.63. Buick's average was \$56.05.

#### THE BULL OF THE WOODS



# facts about LEDLOY\* FREE-MACHINING STEELS

### The Inland process of adding lead to any steel improves machinability from 25 to 50% without affecting mechanical and metallurgical properties

Ledloy is Inland Steel Company's trade name for any grade of steel to which lead has been added to obtain greater machinability. Inland regularly produces Ledloy free-machining open hearth steels to a wide varie'y of chemical specifications to meet customer requirements. In each instance, regardless of the chemical composition, the addition of lead by the Inland process results in no significant change in the desirable mechanical and metallurgical characteristics of the steel. All the important qualities of open hearth steels, such as ductility, impact values, transverse strength, case hardening qualities and cross sectional soundness are retained. Any heat treating, or forging operation that can be performed on similar non-leaded grades of open hearth steels can be performed on Inland Ledloy free-machining steels.

What is affected, and to a marked degree, is machinability! Though Inland Ledloy steels contain only about one-quarter of one percent lead, distributed evenly throughout the steel, this small quantity of lead does amazing things to the steel's machinability. On-the-job use consistently shows cold drawn Ledloy can be machined 45% faster than B1113 and 100% faster than B1112. Surface speeds of 325 feet per minute are common and much higher speeds are possible; up to 450 sfm with high speed

tools and up to 600 sfm with carbide tooling.

Not only is speed increased, but down-time for tool changes is markedly reduced. The reason is that Inland's process of adding lead to steel lowers the steel's friction component and actually lubricates the cutting tool during machining. Less heat is generated, tool-edge build-up is minimized and tool life is increased considerably.

Ledloy steels' shorter-length chips generally fall clear of the tool and Ledloy's lubricant characteristic aids in preventing chips from welding to the tool.

Ledloy steels are especially clean-cutting and machine to a fine, smooth finish - smoother than that obtained with other free-cutting steelsmaking dimensional tolerances easier to maintain. In practically all cases, Ledloy steels may be fabricated-sheared, bent, formed, torchcut, welded, brazed-in the same manner used for steels of the same base chemical composition and with equal or better results.

Many grades available-Inland Ledloy freemachining steels are available in a wide range of standard carbon and alloy grades in bar form. Ledloy free-machining plates are also produced.

If your product requires machining, it will pay you to get all the details on Inland Ledloy . . . the original leaded steel. Ask your cold-drawer about it today, or write Inland Steel Company, 30 West Monroe Street, Chicago 3, Illinois, for the interesting booklet, "Properties of Inland Ledloy Steels."

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the world's most machinable

### **Anti-Recession Tools Take Hold**

#### Business Upturn May Come Sooner Than Expected

Feeling is that the government anti-recession moves are beginning to have some effect.

Despite rising unemployment, personal income holds up.

Improvement in production and buying could come earlier than some forecasts.—By G. H. Baker.

Slowly but surely, the government's anti-recession tools are beginning to "bite in." As a result, the long-awaited upturn in production and buying is likely to come sooner than expected.

It works like this: Defense spending has been on the rise since December. The rate of orders will continue to grow. More dollars are reaching defense contractors and their employees.

Spending Speeds Up—In addition, spending for the \$50 billion federal highway program is finally beginning to pick up speed. Housing construction, which jogged along last year at only a million new units, will pick up speed.

Personal income is running at record levels. Although unemployment is rising slowly, those who are working have money to spend. Sooner or later they'll have to spend it, the government reasons.

#### **Labor Is Optimistic**

Labor leaders are hoping for an early upturn in business activity to bolster their demands for higher wages this year. Only a few weeks ago, they feared a prolonged sag in business would kill off chances for pay increases. But the added spurt in government spending, plus re-

awakened consumer demand for new homes and other durables is stiffening demand for new goods and services. As a result, employment will be on the rise again late in the second quarter or early in the third quarter, they say.

Another factor supporting labor's demands is the government consumer price index, at an all-time high despite the current recession.

#### **Aid Small Business**

Small concerns would be encouraged to seek more guided missiles work, under a program offered by Sen. Thye (R., Minn).

He urges formation of special subgroup of the Senate Small Business Committee, on which he's the ranking Republican. This new subcommittee promotes broader use of small firms on missiles contracts. Defense Dept. would be expected to allot part of its missiles business to small companies.

Principal jobs for small business, Sen. Thye recognizes, would be the supplying of components or performing of research. He visualizes the earmarking of some missiles contract work for small firms.

#### For Closer Scrutiny

A change in how Congress examines requests for defense money is probably going to make it more difficult for the Army, Navy, and Air Force to coax money for pet projects out of the lawmakers.

The change is this: The House Appropriations Committee, where all money requests tee off, has voted to abolish its separate Army, Navy, and Air Force subcommittee panels in the future.

#### **Expense Accounting Still An Issue**

Congress Ponders—Government tax men may find their plans for keeping closer tabs on expense account claims held in check by Congress.

Rep. Hebert (D., La.), offers a bill to prevent employees in business and industry from being saddled with "more onerous" recordkeeping demands. His measure is before the tax-writing House Ways and Means Committee, where Mr. Hebert expects to find support.

Tax Men Want—Last year, Internal Revenue Service wanted tax-payers to enter the amounts of their business expenses on 1957 income tax form. But IRS was hit by a spate of protests. It is unfair, many

of the protests noted, to ask detailed figures which taxpayers normally don't keep.

IRS decided to hold off its expense-reporting order, to apply to 1958 income.

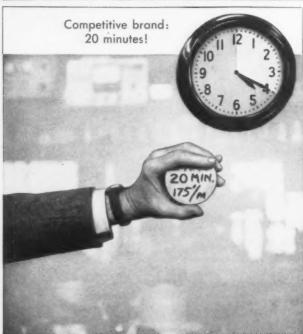
Too Much Bookkeeping — The Hebert bill would bar IRS from requiring more detailed expense records than employees had to keep during 1957. Its author holds that a lengthy accounting of expenses would weigh heavily against the little businessman.

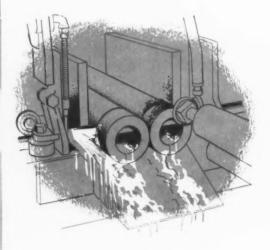
IRS is right to track down false and padded claims of business expense, Mr. Hebert agrees. However, the government should go to the source of expense funds—the firms which provide them.

# **Cutting Oil takes the time test**

at S. G. Frantz Co., Inc., Trenton, N. J.







S. G. Frantz Company decided to keep a truly open mind.

They'd been using Cities Service Chillo Cutting Oil and other Cities Service products for some time with great satisfaction. Still, there was no harm testing Chillo Cutting Oil against another brand just to make sure they were getting maximum results.

But even the people at S. G. Frantz never expected what followed. Using the competitive oil, and a piece of 4130 aircraft rod, 2% in diameter, they made a single cut at saw speed of 175 feet per minute. Time: 20 minutes.

Next, the same test again – but this time with Cities Service Chillo "A" Cutting Oil. Time: 7 minutes! Nearly three times faster!

Using the same material on another job, the Frantz Company found difficulty making clean threads to aircraft standards on a Number 5 Turret Lathe—that is, until Cities Service Chillo 10Z was tried. Right there the problem ended.

"The problem ended." You'll hear it again and again from those who use Cities Service Cutting Oils and lubricants. And perhaps these oils can end a problem for you, too. Talk with a Cities Service Representative. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES ( SERVICE

**OUALITY PETROLEUM PRODUCTS** 

## Missile Building Picks Up Speed

#### Here's Guide to New Contracts in Farwest

Metalworkers on the West Coast are getting increasingly active in missile work.

Boost in production of Atlas and Bomarc are coming soon.— By R. R. Kay.

• Missile making is creating plenty of talk along the Coast. Almost every day there's word about new orders and new developments.

Many metalworking firms have contracts from the missile makers. And others are spending time figuring how to cash in on the multibillion dollar program.

This up-to-the-minute rundown might give you an idea where to look for missile business.

Activity on the Atlas—The \$2-million-a-piece Atlas Intercontinental Ballistic Missiles (ICBM) are in for a boost in production. So says J. V. Naish, executive vice president, Convair, San Diego. The missile is now in pilot production only.

Look for Douglas Aircraft, Santa Monica, Calif., to step up its bid for contracts to make handling and ground support equipment for missiles. A. E. Raymond, senior vice president, figures that about half the cost of a missile project is in this type of equipment. There might be a bigger market here for metalworking materials, products, and services than in the missiles themselves.

Aerojet-General Expands—Very large solid propellant rocket motors for the Navy's Polaris (IRBM) are now a reality. Aerojet - General Corp., Azusa, Calif., developed them for Lockheed Aircraft, the prime contractor for the Polaris. To step up its missile work, Aerojet

will hire, at its Sacramento (Calif.) plant, 1000 more engineers and skilled workers by June 1. The company now has 7000 people on its payroll there.

Busy on the Bomarc—In Seattle, Boeing Airplane landed an \$80 million USAF contract. Half of the amount is for 100 Bomarc ground-to-air missiles. Half will build two firing bases. The company now has \$210 million in Bomarc work.

And that's not all. There's a strong inference that the USAF will order about 400 more Bomarcs.

Washington's Sen. Henry M. Jackson wanted to know the cost per unit. An Air Force spokesman replied: "The over-all cost for each missile, after we reach 500, will be \$420,000."

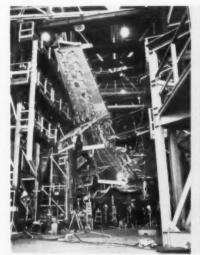
At that rate, it looks as if Boeing,

one day real soon, will get an order for more than \$200 million in Bomarcs.

Improvements for Falcon—Hughes Aircraft's Tucson, Ariz., plant has a \$19 million order for advanced versions of Falcon air-to-air guided missiles. The Air Force contract is for GAR-3 and GAR-4 (guided air rocket). Model numbers 1 and 2 are now flying with USAF all-weather jet interceptors.

Norris - Thermador Corp., Los Angeles, got a \$1.2 million order. The military wants steel cartridge cases and containers and steel bodies for the M15 JATO (jet-assist-take-off). Work on the contract will take place at two locations. Norris-Thermador plants in California and in Texas will share the job.

#### **Destruction Is Goal of This Aircraft Test**





**BREAK-UP OF A WING:** Part of Boeing's static test program for the KC-135 includes testing wings to destruction. View at left shows wing just before break, bent more than 12 ft. At right is moment of failure.



ARMSTRONG-BLUM MFG. CO.

5700 BLOOMINGDALE AVE. - CHICAGO 39, ILL,



## Big Push Due on Cutting Research

#### Many Feel Government Program Is the Answer

Finding better ways to machine our tough, new superalloys is a critical need.

But there's a three-way split over best way to handle the job. —By E. J. Egan, Jr.

• Does the U. S. need a massive, coordinated, Government-subsidized crash program devoted to metal cutting research? Many machining experts think "Yes"; others say "No."

It's no secret that major phases of our aircraft, missile, ground ordnance and atomic energy programs are smack up against a critical production problem: How to machine a bewildering variety of new superalloys with speed and accuracy.

Lots of Nibbling—These miracle metals don't cut like butter, or aluminum, or cast iron, or mild steel, or anything else you ever heard of. They're super - hard, super - tough, and—every time the Russian bear lets out another growl—the problem gives thousands of American engineers a new case of jitters.

Across the country, in laboratories, toolrooms, and on production lines, machine tools nibble, just nibble, at the excess metal on superalloy forgings and castings. Let someone try to hog off big chunks of the stuff and BANG! Cutting tool edges crumble away, machines vibrate and groan in protest.

**Builders Take Blame** — Nobody blames the alloy producers. If anything, they're being encouraged to make even stronger, lighter, more heatproof alloys.

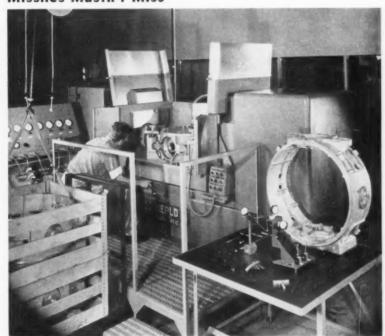
But machine tool builders don't get off so easily. They're needed constantly to come up with more speed, horsepower, rigidity, and flexibility, or even "a completely new approach to metal removal."

Even if all the builders had research facilities (many of them don't) it would be beyond their financial and manpower resources to come up with all the answers that seem to be needed.

So Do Toolmakers—Makers of new types of cutting tool materials are under a lot of pressure, too. Most of them don't have their own machining-test setups, so they send their products here and there to be evaluated. The reports they get back range all the way from "terrific" to "lousy," with a big batch of "we're not sure" answers right in between. Is it possible to get clean-cut answers on just how to machine superalloys at something better than a slow crawl? Most authorities will agree in the affirmative. They'll also agree that it's going to take a lot of research. But they split three ways on the question of how to research most efficiently.

One group wants a big, central Government laboratory to get all the answers in a hurry for everyone concerned. Another insists the military and atomic-energy people should run giant labs of their own. The third idea is to let private industry expand its research programs with Federal funds.

#### Missiles Mustn't Miss



**CLOSE WORK:** Gimbal rings for AC Spark Plug's inertial guidance system must be machined and gaged to within millionths of an inch.

#### INDUSTRIAL BRIEFS

Moving Day—Dana Corp.'s Parts Div. has moved to a modern new office and warehouse building at 253 Wagonner Blvd., Toledo. Construction of the new building is adjacent to the company's general offices and Toledo manufacturing plant. The Parts Div. will operate as a self-contained division within the corporation. Its status will be identical with the Dana production units in Detroit, Mich.; Auburn, Fort Wayne and Marion, Ind.; Reading and Pottstown, Pa.; and Toledo.

Ferrosilicon Pigs—To help steelmakers improve silicon recoveries and reduce handling problems, Electro Metallurgical Co. is offering a new pig-cast form of 75 pct ferrosilicon. Heretofore, this material has been supplied in mixed lumps varying in size from 75 lbs down to 2 inches. The new pigs are dense and strong and resist breaking in transit and handling.

Same Old Stand—Nathan Trotter & Co.'s New York office is to be merged with Frank Samuel & Co., Inc., at the same address. Personnel and services will continue as under the present name. Frank Samuel & Co., Inc., will handle various nonferrous metals including tin, copper, lead, zinc, antimony, cadmium, nickel, bismuth, antimonial lead and other white metal alloys.



"See . . . Bently never takes advantage of his expense account."

All for Electronics — Wigton-Abbott Corp., engineers and Constructors of Plainfield, N. J., has been awarded a contract to design and construct a \$1.5 million chemical process plant for Merck & Co., Inc. It will be constructed at the chemical company's Cherokee plant in Danville, Pa. The plant will be part of Merck's new facilities, totaling more than \$5 million, for expanded production of ultra-pure silicon for the electronics industries.

Missile Work—Beckman Instruments. Inc., has a \$132,000 contract from North American Aviation's Rocketdyne Div. It is for two high-accuracy analog computers designed to speed the development of advanced rocket and missile engines. The computers will enable Rocketdyne to "test run" new engines before they are built. With the instruments, engineers can set up electronic models of proposed power plants and subject them to a variety of operating conditions simply by adjusting computer controls.

Shelf Space—Nearing completion in Williamsport, Pa., is a new 44,000 sq ft plant of Vidmar, Inc., Division, Volkert Stampings, Inc. It will manufacture high-quality metal storage equipment for industry. Production is scheduled to begin this summer. The parent company, based in Queens Village, N. Y., manufactures precision metal stampings for the electronics industry.

Widening Markets — William Brand & Co., Inc., Williamntic, Conn., has organized a new subsidiary corporation. It will be known as William Brand Wire & Cable Corp., located at 3030 Nebraska St., Santa Monica, Calif. New corporation will specialize in the manufacture of custom cables and cable assemblies for missile, aircraft, business machine and other electronic applications representing large markets on the West Coast.

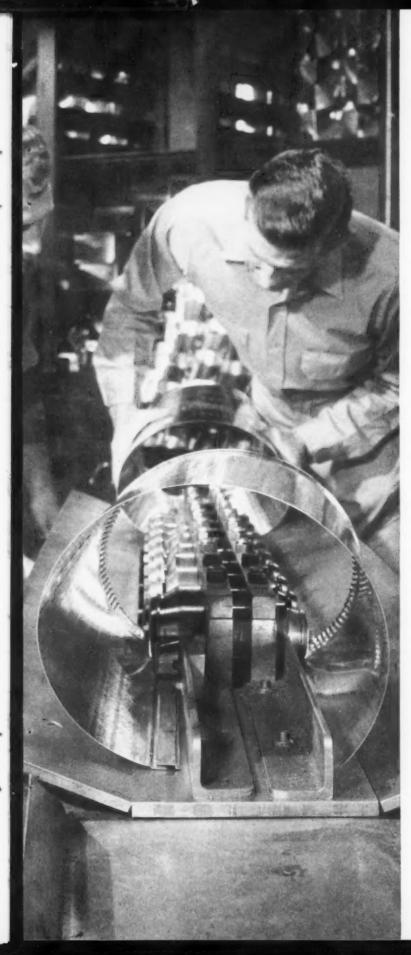
Saludos — Enthone de Mexico S. A. has been formed by American Smelting & Refining Co. to produce and sell the Enthone line of metal finishing products in Mexico. The new enterprise has been set up in recognition of the growth of metal finishing industries in Mexico and the developing need of these industries for a domestic source of supply of metalfinishing chemicals. The new company will operate as a subsidiary and be headquartered in Mexico City.

Setting Up Shop — Clyde Williams, formerly president of Battelle Memorial Institute, has formed a new company. Purpose is to assist boards of directors and top management of industrial corporations with broad technical and business problems. The firm will be known as Clyde Williams & Co. It will serve a wide range of industries in the U. S. and abroad. Central operations will be located at 50 W. Gay Street, Columbus, O.

Good Stock—A new corporation has been formed with annual sales in excess of \$200 million. Named Engelhard Industries, Inc., it was formed by a consolidation of nine American companies in the precious metals and precision-manufacturing fields, some of them over 50 years old. Three other domestic companies and 12 foreign corporations also are controlled by the same interests.

Sub Contract — A \$1.5 million contract has been awarded Westinghouse Electric Corp. by the U. S. Navy Bureau of Ships for propulsion equipment for a small nuclear-powered submarine. Contract includes propulsion motor, propulsion turbine generators, propulsion control, ship service turbine generators and steam condensing equipment. Westinghouse plants at E. Pittsburgh, Buffalo, and Lester, Pa., will share the work.

Silent Partner — The Timken Silent Automatic Div. of Sciafe Co., Pittsburgh, has been acquired by Iron Fireman Manufacturing Co., Cleveland. The Timken division makes and distributes residential heating equipment including oil and gas-fired burners, furnaces, and boilers.



"We just don't worry
about chipping
or flaking
when we lock-seam
WEIRKOTE®!"

If those difficult lock-seaming operations give you trouble, it's time to take the step that leading manufacturers everywhere are taking.

Switch to Weirkote zinc-coated steel as promptly as you can.

Weirkote's continuous process integrates the zinc and the steel so that the most complicated short-radii bends are made without chipping or flaking. Weirkote can be worked to the very limits of the steel itself — spinning, deep drawing, crimping, twisting, the works. Comes through in perfect shape to give your products lasting anti-rust protection, such as they've never had before,

Weirkote's made that way to behave that way. And *now* it's treated to inhibit wet storage (white oxide) stain.

Can you think of a quicker, easier step to an even better product? To fewer rejects? To more peace of mind? To lower costs? And, perhaps most important, to the greater good will of customers who receive even more value for their money?

Write today for the free booklet that will give you lots of food for thought on the many advantages Weirkote can bring to your products and production. Weirton Steel Company, Dept. A-1, Weirton, West Virginia.



#### WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of



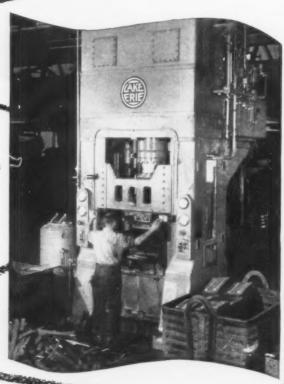
#### SURE SIGN OF SATISFACTION

...Repeat orders

#### ONE OF THE MANY

"Lake Eries" serving "IH" is this 200 ton, side housing, single action press with cushion.

Press has an 18" stroke,
36" x 38" bed, closing and return speed of 750"/min.,
and pressing speed of 67"/min.



#### INTERNATIONAL HARVESTER

has re-ordered from Lake Erie 19 TIMES

International Harvester Company ordered their first press from us in the early 40's... have added 21 more Lake Erie presses since then. Drawing, forging, hot forming, bending, quenching and straightening are some of the many production operations performed by International Harvester with their Lake Erie presses.

MACHINERY CORP.
BUFFALO, NY. U.S.A.

LAKE ERIE MACHINERY CORPORATION, successor to

#### LAKE ERIE ENGINEERING CORP.

General Offices and Plant: 368 Woodward Ave., Buffalo 17, N. Y. District Offices in New York, Chicago, Detroit.

LAKE ERIE Manufacturers of die casting machines and the most complete line of hydraulic presses for all industry.

- H. T. Marks, elected president. Ferro Corp.
- R. H. Daisley, elected vice president, planning, and W. A. Mattie, elected vice president, administrative, Eaton Mfg. Co., Cleveland.
- R. L. Martz, appointed asst. sales manager, building products, Brainard Steel Div., Sharon Steel Corp., Warren, O.



M. B. Roosa, elected executive vice president, Parker Rust Proof Co., Detroit.

- Dr. J. V. Petrocelli, appointed head, Electrochemical Section, International Nickel Co.'s Research Laboratory at Bayonne, N. J.
- W. G. Fallon, named vice president, director and executive board member. Norton Co., Worcester, Mass.



C. S. Hamilton, Jr., elected vice president and treasurer, Russell, Burdsall & Ward Bolt and Nut Co., Port Chester, New York.



C. A. Keeley, elected treasurer, Universal Atlas Cement Co.

- B. Van Wagner, appointed marketing manager, Anaconda Wire & Cable Co., New York; William Olsen, appointed manager, building wire sales; Robert McIlvane, appointed manager, communication cable sales; Thomas Jackson, appointed asst. manager, industrial sales; A. L. Spina, appointed asst. sales promotion manager.
- L. A. Claybaker, appointed supervisor, manufacturing, General Electric Co.'s Phenolin Varnish operation, Coshocton, O.



**John Michelotti,** appointed director, operations, Clearing Machine Corp., Div. of U. S. Industries, Inc.

- H. L. Waddell, promoted to office manager, Accounting Div., Jones & Laughlin Steel Corp.'s Lebanon, Ind., Container Div. plant; L. W. Knowlton, Jr., appointed office manager, Container Division's Lancaster, Pa., plant and warehouse.
- K. C. Schmedicke, elected vice president and general manager, Lamson Mobilift Corp., Portland, Ore.; K. L. Ross, elected treasurer and manager, sales.
- V. I. Rhodes, appointed asst. superintendent. Shops Dept.. Youngstown district, Youngstown Sheet & Tube Co.



J. W. Elbin, appointed general works manager, Cleveland Forge Works and Cleveland Die Cast Works, H. K. Porter Co.'s Forge and Fittings Div.

- Dr. Curt Rolland, promoted to president, New Jersey Rolling Mills.
- L. J. Burger, named general manager. Gas Turbine Dept., Schenectady, N. Y., General Electric Co.; J. P. Keller, named general manager, Small Steam Turbine Dept., Fitchburg, Mass.
- **D. W. Heck,** promoted asst. to the works manager, Brackenridge Works, Allegheny Ludlum Steel Corp., Brackenridge, Pa.

G. R. Lagerstrom, appointed asst. chief engineer, and A. B. Glover, named asst. to chief engineer, Republic Steel Corp.'s South Chicago steel plant.



**J. L. Hallett**, appointed asst. general manager. Heavy Construction Div., Henry J. Kaiser Co.

C. W. Sanford, elected vice president, manufacturing, Grouse-Hinds Co., Syracuse, New York.

Following appointments have been made at Crucible Steel Co. of America, Cleveland, O., sales branch. W. J. Bernardy, appointed asst. branch manager—staff; D. W. Sturges, named asst. branch manager—field.

**J. H. Cadieux**, named vice president, Casting Engineers Inc., Chicago.

**G. W. Streepey,** named asst. general manager, Mining Div., Aluminum Co. of America, Pittsburgh.

J. E. Duff, named general sales manager, Electrical Products Div.. St. Louis, Joy Mfg. Co.

W. F. Schlick, appointed general sales manager, Sterling Grinding Wheel Co., Tiffin, O.

J. M. Gerber, appointed western regional sales manager, Wire and Cable Div., The Electric Auto-Lite Co., Toledo, O. V. R. Troglione, appointed general manager, Industrial Furnace Div., Sunbeam Corp., Chicago.



**J. H. Moore**, named general manager, NRC Equipment Corp., Cambridge, Mass.

W. B. Firman, appointed marketing manager, Orr & Sembower, Inc., Reading, Pa.

**J. E. Hughes,** appointed asst. general manager, Kaiser Engineers Div., Henry J. Kaiser Co.

E. C. Austin, appointed director, purchases, The Fluor Corp., Ltd., Los Angeles.



**H. D. Stone**, becomes sales manager, NRC Equipment Corp., Cambridge, Mass.

S. L. Hoff, named development engineer, International Graphite and Electrode Div., Speer Carbon Co., St. Marys, Pa.





## INLAND STEEL IS SAVING approx. 125 MAN HOURS EACH MONTH on JUST ONE SPECIFIC REQUIREMENT

"Four to six cars of carbide per month were formerly unloaded by three or four men working eight hours per day.

"THROUGH THE USE OF SILENT HOIST FORK LIFTRUK Model FK 7½, THIS SAME OPERATION IS NOW COMPLETED IN A PORTION OF THE TIME BY ONE OPERATOR ... SAVING APPROXIMATELY 125 MAN HOURS PER MONTH" ... releasing men and fork truck for other useful purposes. Report from INLAND STEEL CO. EAST CHICAGO.

SILENT HOIST LIFTRUK is a rea; work horse — operates long periods without maintenance — on muddy or irregular terrain. STANDARD EQUIPMENT includes Fluid Drive, Pawer. Steering, High Undercarriage, extra large torque multiplier for traction.



Ask for Bulletin No. 77.



SILENT HOIST & CRANE CO.

Pioneer Mfrs. of Heavy Duty Materials-Handling Equipm 851 63rd Street, Brooklyn 20, N. Y. Eugene Lepkowski, appointed controller, Assembly Div., Square D Co., Detroit.

Frank Domenick, Jr., appointed senior cost analyst, Universal-Cyclops Steel Corp., Bridgeville, Pa.



J. E. Hovis, appointed vice president, sales, F.E.I., Inc., Cleve-Jand.

Leo Yakutis, appointed die sales engineer, Ohio and sections of New York and Pennsylvania, Carboloy cemented carbide products, Metallurgical Products Dept., General Electric Co., Detroit.

Dr. A. C. Hall, named director, research, The Martin Co.



S. H. Wilson, appointed asst. to vice president, sales, Revere Copper and Brass Inc.

F. S. Gregory, elected asst. treasurer, Atlantic Steel Co., Atlanta, Ga.

F. A. Erickson, appointed stampings sales manager, O. E. Peterson, appointed mutual sales manager, and D. B. Stowe, appointed Hi-Pac engineering manager, Worcester Pressed Steel Co., Worcester, Mass.

J. I. Julian, appointed vice president, Solar-Chicago Co., Div. of U. S. Industries, Inc.

A. W. Cain, promoted to presi-

dent, Volco Brass and Copper Co., Kenilworth, N. J.

R. L. Wheland, appointed coordinator, suggestion award and industrial defense programs, Jones & Laughlin Steel Corp.

V. W. Vaurio, appointed metallurgical engineer, tin plate, U. S. Steel's Tennessee Coal & Iron Div., Birmingham, Ala.



QUICK-CONNECTIVE
FLUID LINE COUPLINGS
for

afford large area contact with Plug, thereby

preventing wear and subsequent leakage.

AIR • OIL • GREASE
HYDRAULIC FLUIDS • WATER
VACUUM • STEAM • OXYGEN
ACETYLENE • REFRIGERANTS
GASOLINE • COOLANTS

The ability of Hansen Push-Tite Couplings to withstand severe service—with practically no maintenance—has been thoroughly proved by years of hard, everyday use in thousands of plants. The "socket head", which contains the locking device, is factory assembled into a rugged integral unit which cannot be readily injured or have component parts lost by casual tampering. To connect the Coupling, you merely push the Plug into the Socket with one hand. Flow is instantaneous. To disconnect, push back sleeve on Socket—Coupling disconnects, Flow is shut off instantly and automatically.

WRITE FOR THE HANSEN CATALOG

Here's an always ready reference when you want information on couplings in a hurry. Lists complete range of sizes and types of Hansen Quick-Connective Couplings. Write for your copy.



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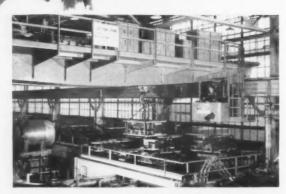
QUICK-CONNECTIVE FLUID LINE COUPLINGS

MANUFACTURING COMPANY

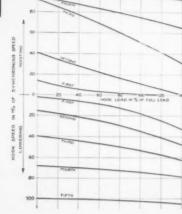
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# Here's Why Men in Command





25-ton crane, equipped throughout with EC&M Control, gives excellent results in handling dies in automotive plant



Hook-speed curves tell the story! Nearly flat curves, regardless of load. Braking torque regulated from the simplest of magnetic amplifiers. No costly electronic tubes or complicated bias control involved



THE ELECTRIC CONTROLLER & MFG. CO.

A DIVISION OF THE SQUARE D COMPANY CLEVELAND 28 • OHIO

# EC&M EDDYMAG\* A-C Crane Control

**ALL LOWERING SPEEDS SAFE** because braking torque is automatically adjusted. Any tendency for the motor to speed up increases the eddybrake torque to insure safe lowering of all loads.

**FAST RESPONSE** enables the operator to "inch" loads accurately. Speed regulation is excellent, too. On first point, the empty hook starts down and the same point provides slow speed for "inching" heavy loads.

**EASIER MAINTENANCE** • All EC&M components are standard, mill-type construction—familiar to maintenance men, simple to work with, easy to understand.

SIMPLE CIRCUITRY • "EDDYMAG" Control uses no sensitive circuits—no tubes to balance. EC&M Frequency Relays, operating from the slip frequency of the motor, provide crane performance unequalled by other methods. Only one plugging relay and one set of acceleration relays required for smooth operation of the a-c wound-rotor motor-driven crane.

Join the men who know performance—specify EC&M Control for your next crane. For complete facts, write for Bulletin 6400

\*EDDYMAG is an EC&M registered trademark

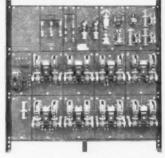


ECAM Manual-Magnetic Disconnect Switches provide a safe and convenient means for "killing" the crane



ECaM Youngstown Safety Limit Stops prevent over-hoisting accidents

#### EC&M PERFORMANCE-PROVEN EQUIPMENT FOR CRANES



ECAM EDDYMAG Hoist Control uses mill-type contactors and relays—off-point braking helps stop the load

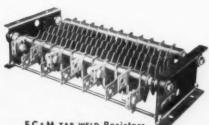


ECaM Master Switches— Cam or Vertical types—are compact, easy to operate

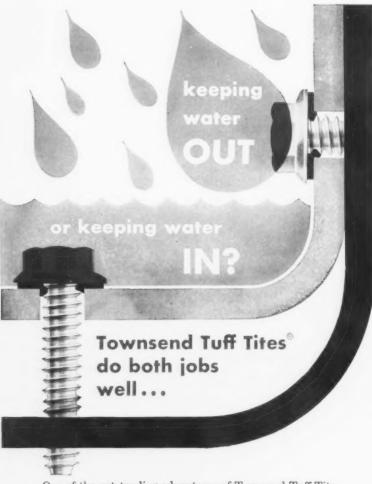


ECaM Type WB Brakes

—100% lubricated — dirt
can be flushed out



ECAM TAB-WELD Resistors eliminate burning at the grid eyes and at the tap plates



One of the outstanding advantages of Townsend Tuff Tite fasteners is that they provide an economical means for leakproof joining of metal, asbestos, porcelain or plastic. The pre-assembled conical neoprene washers flow into the holes as the fasteners are seated, filling them and making waterproof seals. Tuff Tites are effective for any application requiring leakproof joints, such as those needed in the construction or appliance industries.

Tuff Tite advantages include ease and economy of installation, surface protection and vibration resistance. Standard items are immediately available from jobbers and warehouses. Tuff Tites are also available in numerous special designs to suit any application need.

If you are joining metal, plastic, porcelain or asbestos, you should know about Townsend Tuff Tites. Your Townsend representative will be glad to discuss them with you, or we will send you complete literature. Townsend Company, P. O. Box 237-B, New Brighton, Pa.



GOOD FLOW

The Fablening Authority

Townsend
COMPANY - ESTABLISHED 1816

HER BEGIFTON, FEMALISHED 1816

HER BEGIFTON, FEMALISHED 1816

HER BEGIFTON, FEMALISHED 1816

Ganage State State

B. J. Fletcher, named general manager, engineering, Engineering Dept., Aluminum Co. of America. Pittsburgh; L. B. Kuhns, appointed chief engineer; H. F. Robey, Jr., named chief construction engineer.



**H. C. Wilson,** appointed sales manager, aluminum products, Revere Copper and Brass Inc.

E. A. Siemssen, appointed tool and liaison engineer and coordinator, Selas Corp. of America.

Alex Shashaty, appointed chief engineer. The Enterprise Co., Columbiana, O.; C. D. Shickley, appointed asst. chief engineer.



W. A. Richardson, named asst. district sales manager, Detroit district, Republic Steel Corp.

Robert Ramsbotham, appointed plant manager, Fabricating Div., The Plume & Atwood Mfg. Co., Thomaston, Conn.

W. M. Gibbs, named marketing manager, sheet and plate products, Kaiser Aluminum & Chemical Sales, Inc., Oakland, Calif.; J. E. Griffith, Jr., named products manager, sheet and plate, Chicago.



E. G. Merk, appointed national sales manager, Burgmaster Corp., Gardena, Calif.

- N. E. Firestone, appointed general manager, General Electric Co.'s Production Engine Dept., Evendale, O., headquarters.
- J. J. Durkin, named Seattle district manager, "Automatic" Sprinkler Corp. of America.



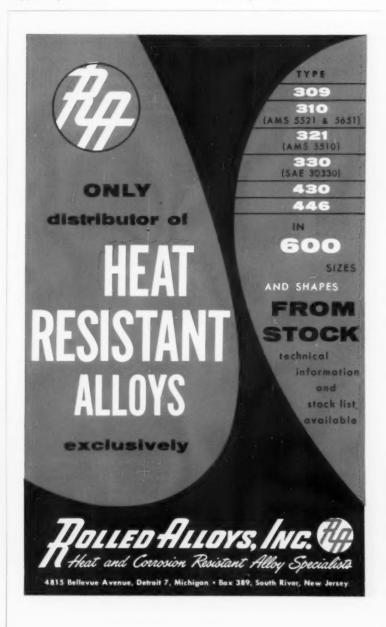
A. R. Johnson, named manager, strapping products and services, Gerrard Steel Strapping Dept., U. S. Steel Supply Div., U. S. Steel Corp.

C. L. Frederick, appointed director, engineering, North American Refractories Co.

- W. H. Rhodes, Jr., named sales manager, Nonferrous Metals Div., Pennsylvania Industrial Supplies
- L. J. Wiegand, appointed asst. sales manager, Sidney Machine Tool Co., Sidney, O.
- **R. M. Thomas**, appointed sales manager, Edmont Mfg. Co., Coshocton, O.
- **J. H. Stoops**, appointed general sales manager, Huppower Div., Hupp Corp., Detroit.

#### **OBITUARIES**

- F. A. Shick, 80, retired vice president and comptroller, Bethlehem Steel Co.
- W. J. McIlvane, 62, former executive vice president, Wire and Cable Div., Copperweld Steel Co.
- J. H. Merrell, honorary director, Raybestos-Manhattan, Inc.
- W. E. Buck, retired chief metallurgist, Sheet Div., Continental Steel Corp., Kokomo, Ind.



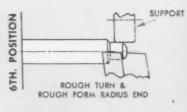


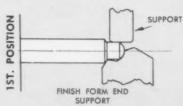
All'round the world...

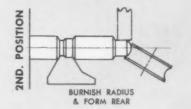
#### How Acme-Gridley BASIC DESIGN Saves Time in England

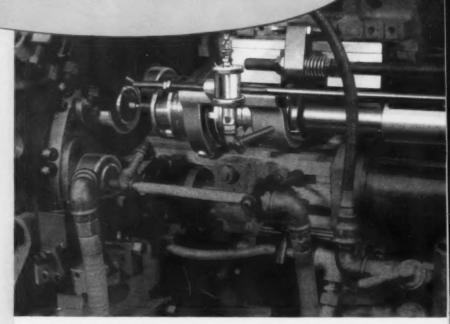
Tappet set screw, produced in England on a British-built 6-Spindle Asma-Gridley Bur Automatic. 10 operations—including thread rolling, induction hordening radius end, retating pickoff attachment and slotting rear and—performed in 7 seconds machine time.



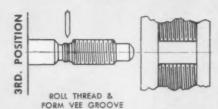


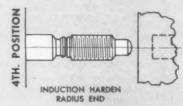


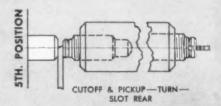




Front view of tooling zone, showing threading attachment (Acme-Fette Thread Rolling Head) in the third position, rolling %=20 threads on end of work piece.







#### ... where there's work to be done and time to be saved ...

# there's an Acme Gridley to do it!

Regardless of whether they are "made in Britain", "made in Germany", or "made in the U.S.A." Acme-Gridley Automatics all speak a universal language greater and more accurate production.

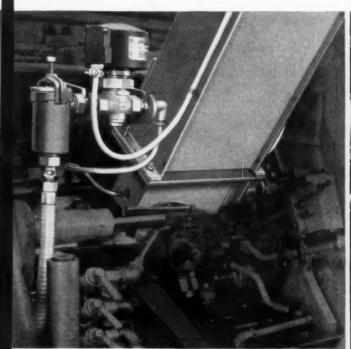
Wherever reduced production cost is the goal, the same basic ruggedness, the same wide-open tooling zone with the same distinctive tool-slide arrangement that encourages ingenious tooling on an Acme-Gridley in Detroit, challenges men's minds in Jaipur!

A recent example is this tappet screw, produced on an Acme-Gridley which was built by our licensee BSA Machine Tools Ltd., of Birmingham, England.

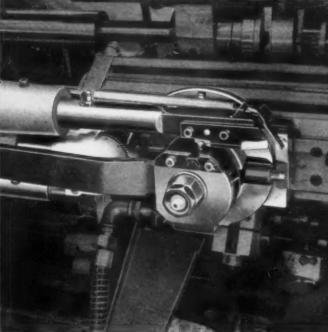
A unique combination of three operations nor-

mally considered "secondary", with seven others in the primary setup, eliminated costly extra handling and equipment. In addition to normal machining, the piece was induction hardened, threads were rolled on, and the piece was picked up, turned around and slotted -a total of 10 operations in 7

This is typical of the way the Acme-Gridley principle of circumferential automation eliminates secondary handling-all over the world. It's what we mean when we say, "where there's work to be done, and time to be saved, there's an Acme-Gridley to do it!"



Detail of induction hardening device, showing quench oil reservoir and automatic metering valve for hardening radius end of tappet screw.

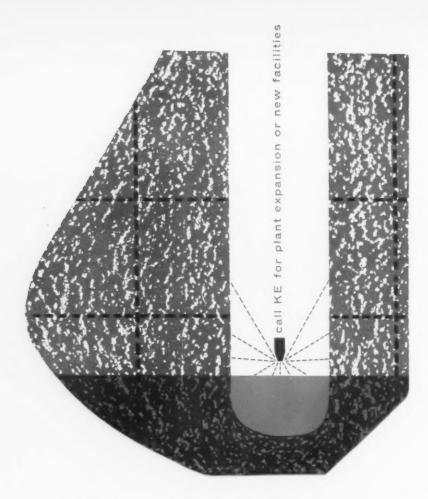


Detail of rotating pickoff attachment which picks off piece following cutoff in fifth position, rotates 180° so that piece can be slotted by saw (at left) in the sixth position.

DEX ... to lower with Acme Gridley

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WITHSTANDS WEATHER: It only takes a few hints to know how to get full benefits from Aluminized steel

# How to Work Aluminum-Coated Steel

By W. E. McFee—Armco Steel Corp., Middletown, O.

Durable aluminum-coated sheet steel takes the punishment of outdoor service.

But how can you be sure to protect the durable qualities during fabrication?

The answer's in a few simple rules, mostly governed by the aluminum coating. Standard equipment does the job with attention to techniques.

Sheet steel coated on both sides with aluminum possesses the surface characteristics of aluminum and the physical and mechanical properties of steel. The material resists atmospheric corrosion to serve in a wide variety of outdoor products.

Using a patented hot-dip process, Armco Steel Corp., Middletown. O., puts out the aluminum-coated steel known as Aluminized steel Type 2. With all the advantages of the aluminum, it's necessary to modify some of the standard fabricating procedures for cold-rolled steel. For instance, certain revi-

sions in welding techniques provide greatest joint efficiency.

Softness of the aluminum coating dictates care in handling. But experience in many metalworking plants shows that Aluminized steel can be economically fabricated with regular equipment.

Forming Hints—Aluminized steel will go through moderate brakeor roll-forming operations without flaking or peeling of the coating or damage to the base metal. The metal can be effectively bent cold 180° over a diameter equal to twice the thickness. It can be spun or embossed, but it's not suitable for drawing operations.

Where sharp bend radii are required, the heavier gages may show some crazing of the coating along the bend line. Exposure to the atmosphere may discolor these areas.

Discoloration usually does not progress with time, nor does it cause bleeding or undercutting of the coating. Use of lighter gage material or larger bend radii can minimize or eliminate crazing.

Sheared edges will show some

rust on exposure to the atmosphere. The amount depends on severity of the atmosphere and metal thickness, there being less with thin sheets. Exposure tests indicate that there's no bleeding or undercutting of the coating.

Fastening as Usual — Strength and corrosion resistance simplifies attachment or assembly of parts by mechanical means. Yet, because Aluminized steel is so durable, it's best to use fasteners that will last as long as the parent material.

Bolts or sheet metal screws should be hot-dip galvanized for satisfactory life in normal or mild industrial atmospheres. It takes stainless steel bolts and screws for more severe conditions.

Any of the standard welding methods can be used to join Aluminized steel. Joint efficiency is good when welding techniques are suited to the properties of the material.

Both spot and seam welding are especially useful since they do not materially impair corrosion resistance of the metal. When fusion welding is done, proper metallizing will restore corrosion resistance in the weld area.

In fusion welding, aluminum oxide on the surface of the coating tends to prevent steel-to-steel contact and increases weld porosity. Use of correct welding fluxes and recommended welding techniques can solve this problem.

Behaves Like Aluminum — Spot welding adapts well to production jobs. Because of the aluminum coating, the material behaves in some ways more like aluminum than steel.

Both top and bottom welding tips should be composed of Class II hard copper alloy of about 5%-in. diam. Dome radii of about 1 in. are recommended for material under 0.030-in, thick and about 2-in, for heavier material.

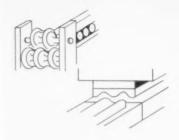
Tips will "pick-up" more than when welding uncoated steel; so they must be dressed more frequently with fine emery. Tips should also be water-cooled or refrigerated for most efficient performance and longest possible life. Since the Type 2 coating has high electrical conductivity, current requirements are greater than for plain steel. For 0.018-in, thick material about 70 pet more current is needed, but this decreases to about 30 pet for 0.080-in, thick material.

Current duration is short, 2 to 18 cycles. Electrode force, depending on gage, ranges from 350 to 1500 lb.

Water Cooling Helps—The same general recommendations for spot welding also apply to seam welding. Class II hard copper roller electrodes are used for longest electrode life.

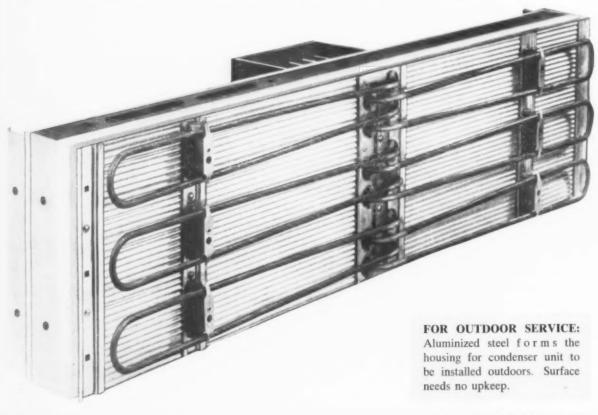
Best results are obtained by seam welding Aluminized steel underwater or directing three streams of water on each of the upper and lower rolls. This produces greatest cooling effect and reduces pick-up Knurled drives will help remove adhering metal from welding surfaces of the roller electrodes.

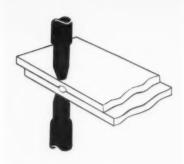
For metal are welding, flux coatings must produce a fluid protective cover to dissolve aluminum oxide.



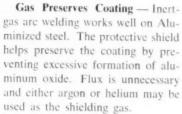
#### TAKES MODERATE FORMING: In either roll- or brake-forming operations, Aluminized steel takes moderate forming without flaking,

Consistently sound welds with steel-to-steel fusion can be attained with low hydrogen rods, such as Lincoln LH-70, Reid-Avery Raco-Fer-Al, and Westinghouse Flex-Are LOH-2. Type 308 stainless steel welding rod produces good results. It's best to keep welding current as low as possible to minimize burning the protective aluminum coating in the weld area.





**CHOOSE CORRECT TIPS:** For spot welding, it pays to choose tips for the job. Water cooling insures long efficient operation.

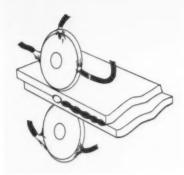


Welding is fast with straight polarity direct current, particularly when no filler rod is needed. Where filler rod must be used, welding wire such as Airco A675, Oxweld No. 1 HT, or Oxweld 66 gives good results.

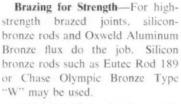
While the inert-gas shield effectively minimizes formation of aluminum oxide, it's desirable to remove the aluminum coating about 3/16-in, back from the joint when welding 16 gage or thinner material. This helps produce duetile, high-quality deposits.

In oxy-acetylene welding, fluxes of the type recommended for stainless steels will eliminate aluminum oxide. Application of the flux to both sides of the parts to be joined and to the welding rod will provide adequate fluxing action. Filler rod material similar to Oxweld No. 1 HT gives good results.

All slag, oxides and residual flux should be removed from fusion welded joints. Sand blasting or wire brushing will usually clean welds satisfactorily. After cleaning, joints should be sprayed with metallic aluminum (metallizing).



**KEY IN COOLING:** For best seam welding, cooling water is directed on welding rolls, or welding is done underwater.



Aluminum-alloy brazing rods will join the aluminum-coated surfaces, but will not make a steel-to-steel joint. These rods are used only for assemblies where the purpose is primarily to render seams water- or air-tight.

The same difficulties in soldering solid aluminum are also met in soldering Aluminized steel. Insoluble aluminum oxide prevents solder from wetting the coating and thus making metal - to - metal contact. Much study is going into the solution of this problem.

Choice in Finishing—Aluminized steel Type 2 does not need surface finishing for corrosion resistance. Yet it can be painted if desired. Paint adheres well and standard schedules can be used. The material cannot be anodized.

Standard practice for metal cleaning applies except as modified by the relative softness and chemical nature of the aluminum coating. Strong alkaline cleaners will attack aluminum. Steel wool or metal cleaning tools will gouge or scratch the surface.

Should it be necessary to remove mill-applied oil or forming lubri-



GAS PREVENTS OXIDE: Inertgas are welding is a fast joining method. Shielding prevents formation of aluminum oxide.

cants, standard solvents or vapor degreasers will work well. Cleaning solutions should be of the nonetching type.

Follow cleaning with a hot water rinse and drying. For normal cleaning in service, it's best to avoid slightly alkaline cleaners.

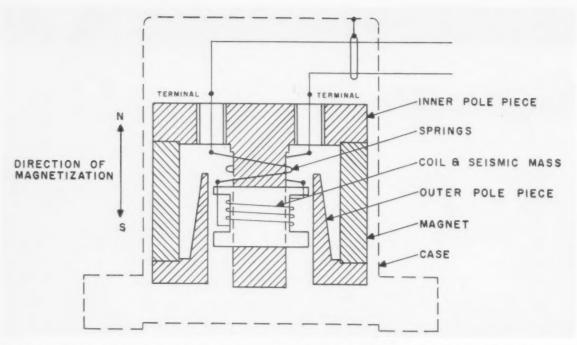
No Harm in Buffing — Aluminized steel can be buffed for surface polish or light reflectivity. A medium muslin buff, thread count 82-94, will do the job, with light pressure.

Fine-grain Tripoli powder works well as a buffing agent. Clear lacquer will preserve the appearance of buffed surfaces in outdoor service.

Normal practices for handling and storing any quality sheet steel apply to Aluminized steel. But proper care should be taken to prevent marring or scratching the soft aluminum surface.

Moisture accumulating between stacked sheets or in coils may cause water straining. However, the surface treatment and oiled condition in which the material is normally supplied minimizes formation of water stain.

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HOW IT WORKS: Vibrations cause the magnet to induce a voltage in typical "velocity"-type pickup unit,

# Vibration Detectors Cure Mysterious Machining Ills

Are vibrations, so small that they can't be seen or heard, robbing your tool life or ruining workpiece finishes?

There's no need to wonder about it. Reliable instruments will give you the answer in a hurry.

More and more firms are using them to plug profit leaks.

■ Unsuspected vibration in machine tools is often responsible for puzzling losses in tool life and poor quality of workpiece surfaces. Vibration of only 0.00006 in. amplitude in a grinder, for example, can produce measurable degradation in the quality of a ground surface.

This vibration occurs at such low amplitudes and high frequencies that it is not readily observed by human eyes and ears. But because it is there, and because it is a worthwhile economy to eliminate it, many firms now use electronic detection and measuring devices to solve vibration problems.

To locate vibration troubles, some use sensitive transducers (or "pickups") and meters, such as those made by Consolidated Electrodynamics Corp., Pasadena, Calif. Self - generating, electromagnetic transducers will detect vibrations in the 5 to 1000-cycle range quite conveniently.

Induced-Voltage Type — Basically, these transducers consist of some combination of a permanent magnet and a moving coil. Motion between the transducer case and an internal seismic mass causes the magnet to induce a voltage across

the coil. (See accompanying diagram.)

The induced voltage across the coil is directly proportional to the displacement and inversely proportional to the period of this displacement. Thus it is a velocity signal, and the pickup unit is known as a "velocity" type.

Another type of transducer made by CEC is called the Torsiograph. This ultrasensitive instrument both detects and measures torsional vibration in rotating shafts. It may be mounted in any position to accurately measure the torsional mode of vibration, even when superimposed on modes other than angular.

The output voltage resulting from instantaneous shaft-speed variations may be fed to a vibration meter for direct indication of relative angular



IT'S EASY: A pickup unit and a portable vibration meter can be set up in short order to measure vibration on a surface grinder.

velocity, amplitude and frequency.

Spots Grinder Flaws — At one large west coast electronics firm, a large surface grinder was producing a very poor finish. Disassembly of the spindle and bearings showed flat spots on some of the bearings which were not apparent when they were rotated by hand.

When the bearings were replaced, the surface appearance of the work was improved but there was still an odd waviness to the grinding lines. A pickup was attached to the magnetic chuck and the vibration meter indicated irregular chuck travel. The source of the trouble was finally found to be a defective valve in the hydraulic sysetm. When it was replaced, excellent surface finishes were produced on workpieces.

Boosts Cutter Life—In another case, a Torsiograph, mounted on a milling machine arbor, helped solve a problem with short-lived cutters in machining a stainless steel forging.

A vibration meter coupled with the pickup instrument showed that the angular velocity of the arbor was anything but uniform. In fact, the arbor was acting as a torsional spring, literally "winding up" each time a cutter tooth contacted the work. The solution was to increase the size of the arbor, which boosted cutter life 75 pct.

Vibration measurements must frequently be made in locations where instrument portability is desirable and electric power is not readily available. To meet these needs, CEC engineers designed a compact, battery-operated vibration meter which uses transistors.

Used Many Ways—Operated in conjunction with standard vibration pickups, the portable unit indicates peak-to-peak linear and torsional vibratory displacement. With auxiliary equipment, its use can be readily extended to the analysis of vibration velocity and frequency.

Portability of vibration-measuring equipment is of prime importance in, for example, pre-flight jet engine run-ups, machine tool checkouts, and mobile tests of many kinds. Here is where a lightweight, battery-operated device, which is simple to operate and produces direct, unambiguous readings, is particularly convenient.

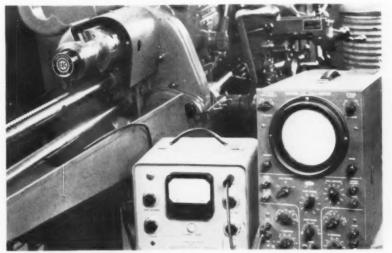
CEC's Type 1-128 meter was designed to meet these requirements, and also to operate under rather

severe environmental conditions. Overall design and selection of components were based on the expectation that the instrument might have to operate in temperatures ranging from -20 to +120°F.

Test Military Items—The military services design ordnance and electronic equipment to withstand any type of vibration that may occur in shipping, handling, or actual service use. To check these designs, the Navy has equipped and staffed a special vibration laboratory within the huge Naval Ordnance Laboratory at Silver Spring, Md. In the special test building, NOL scientists can simulate practically any service condition.

Several airlines use vibration pickups on planes to give early warning of abnormal vibration in power plants. On the planes of one major line, pickups are mounted at either the 3 or 9 o'clock positions on the front gear housing of each engine. In this position, the pickup is insensitive to shocks caused by takeoff, landing or air turbulence, which might otherwise cause false signals.

In flight, if vibration exceeds a predetermined acceptable limit, a signal light marking the faulty engine appears on a control panel in the cockpit. Thus the pilot can take corrective action immediately.



**TRACING TROUBLE:** A Torsiograph attached to this lathe spindle showed it did not revolve smoothly under load. The trouble was traced to a V-belt which had started to separate into layers.

## **Dual Fixturing Boosts Brazing**

By W. E. Atkinson-Chief Industrial Engineer, Evans Products Co., Plymouth, Mich.

Induction brazing machines work only half time if they have to wait for loading of fixtures.

Likewise, operators are idle during the brazing cycle.

Dual fixturing plugs these leaks and improves the efficiency of the whole operation.

 Study of a brazing line showed that duplicate fixtures at each induction machine would greatly increase output of bicycle frames. In fact, when the fixtures were provided and one more machine and operator were added, the rate more than doubled.

This increase at Evans Products

Co., Plymouth, Mich., occurred because each operator can load a fixture while brazing is in progress in the duplicate one. The brazed assembly of steel tubing forms the major component in Evans' production of several sizes and models of bicycles.

Brazing for Strength — Each frame has seven joints. To get the required strength and permanence in each joint, Evans uses Handy & Harman Easy-Flo No. 35 silver brazing alloy. Although this alloy has a low melting range, as far as silver brazing alloys go, it is well above that of soft solders. Joint strength is about equal to that of the mild steel.

To keep clearances at joints

within 0.010 in., the fixtures hold the parts securely in correct relative position. Although a rapid brazing rate is attained, care is used to cool the joint slowly by use of air jets rather than water.

For each joint, experiments have turned up the best design of induction heating coil. The coil must apply heat uniformly and yet be fast enough to attain a high production rate without overheating the joints.

Look for Higher Rate—Until recently, five operators using three induction machines could braze an average frame in about two minutes, thus yielding about 30 frames an hour. This was considered too low. The whole sequence depended on the slowest operation.

At this point dual fixturing and the addition of one more machine and operator brought the average rate up to 63 frames an hour. By dividing the operations among more fixtures, loading time is brought close to brazing time. It keeps each operator continuously busy. Since the time for loading and brazing is about equal to that in other pairs, operators seldom have to wait for those performing prior operations.

Of the six people on the brazing line there is one at each of the four induction brazing machines. The fifth man applies rings of Easy-Flo and helps in fluxing of parts (using Phillips flux warmed to 100°F) to keep machine operators supplied with parts. The sixth man performs a reaming operation not directly related to brazing.

Of the four induction machines, three are Weldtronic of 25-kw capacity and one General Electric of 15-kw capacity. Two of the Weldtronics are duplicate machines.

Simultaneous Joining — Making



**STARTS HERE:** While operator is setting up this fixture, assembly in duplicate fixture undergoes brazing of four joints.

### Rate

four joints simultaneously, the first machine joins two main frame tubes and two that form a rear fork to the short cross tube in which the pedal operated crank is installed. Stops in the fixture accurately position all five parts, which are fastened by hand operated clamps,

A timer, that starts when current is switched on, controls a cycle of 35 seconds for heating, 4 seconds dwell with current off to allow the Easy-Flo to set, and 21 seconds for air quenching.

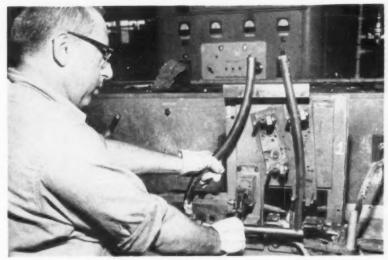
During this period, the operator unloads and reloads the duplicate fixture, and starts its cycle as soon as the previous cycle is completed. Air for quenching, supplied at 40 psi, is directed against the bottom of the short cross tube.

A rack is kept supplied with fluxed tubes in groups convenient for loading. After removal from its fixture, each brazed assembly is set on the floor where it cools until picked up for the next step.

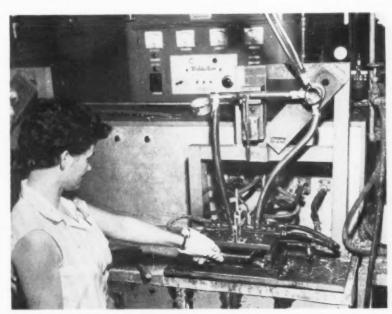
In the second machine, the assembly is clamped for addition of another tube, end-notched to fit at the joint. This second braze requires the same 60-second timing, even though only one joint is produced. As in the first step, the operator loads the duplicate fixture while brazing takes place.

Fixtures Aid Steps—For the third operation, the assembly is toggle clamped with its rear end up. The head tube, to be joined at two points, is clamped horizontally into a V-block to fit inside induction coils.

Brazing time is about 40 seconds, setting time 4 seconds, and cooling time, with compressed air, about 16 seconds. Again, the duplicate fixture is unloaded and reloaded while brazing is in progress.



FAST CLAMPING: Second setup joins tube notched to fit. Stops in fixture help get accurate alignment.



FITS INTO COILS: In third step, head tube is clamped into induction coils with two tubes from main assembly.

A final braze for some types of frame incorporates a short spacer tube between the upper and lower frame tubes. Here rings of Easy-Flo are placed inside one tube. As the induction coil melts the rings, the alloy penetrates the joints.

Reaming is done inside the head tube using end-cutting tools in Ex-Cell-O heads to trim entering tubes a set distance. The frame is air clamped in a holding fixture during machining.

Although the machining operation has no direct relation to the brazing operation, it's figured in determining production rates because one of the six men in the frame production crew is required for the machining step.

# Corrugated Steel Foil Promises Lighter, Stronger Aircraft

By Bruce Mitchell, Structures Engineer, Ryan Aeronautical Co., San Diego, Calif.

It's been feared that aircraft must get heavier as supersonic speeds increase.

Possibly not, since the discovery that tiny corrugations in thin sheet steel boost strengthweight ratios away up.

What's more, structures made from this corrugated foil can be weld-assembled easily.

• A way seems to have been found to make supersonic aircraft either 25 pct lighter, or without adding any weight, make them withstand aerodynamic heating to 750°F. The trick is to put miniature corrugations in very thin sheets of high strength stainless steel, such as the 17-7PH alloy.

This discovery climaxes a threeyear research program conducted by Ryan Aeronautical Co. on the design of lightweight structures for supersonic planes. The company found 17-7PH to be one of the better steels for this purpose, and particularly desirable for thin sheet applications because it can be heat treated without scaling.

After annealing at 1750°F to prepare it for transformation, the steel has a yield strength of 45,000 psi and elongation of 35 pct. After transformation at —100°F its room temperature yield strength is 110,000 psi. The final aging treatment at 950°F produces room temperature yield strength of 200,000 psi, ultimate tensile strength of 240,000 psi, and 5 pct elongation.

Matches Titanium—If this steel were to match the strength-to-weight ratio of a 6Al-4V titanium alloy at room temperature, a 250,000-psi yield strength would be required. But the difference grows less as temperature increases. At 700°F, 17-7PH and the Ti-6Al-4V

alloy both have a yield strength of about 160,000 psi.

For practical reasons, much of the theoretical room temperature advantage of the titanium alloy is lost. The material is not available in sheets thinner than 0.025 in.; it cannot be welded or formed easily; and it is expensive.

On the other hand, the theoretical strength - to - weight advantage of steel over aluminum or magnesium at either room temperature or higher values can be a practical one. The idea is to use the full, available strength of the steel.

To exploit the room temperature yield strength of 17-7PH (200,000 psi), ways had to be found to (1) stabilize thin sheets for compression loads of this magnitude, or (2) collect the load and concentrate the material until stabilization is possible.

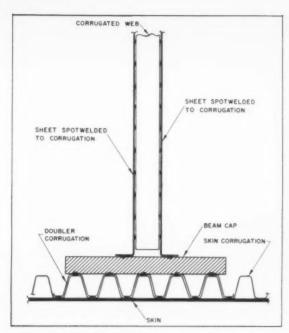
Needs Stiffeners—Ryan engineers calculated that, to prevent buckling under a 200,000-psi stress, stiffeners would be needed. Moreover, stiffener spacing of 0.50 in, would be needed with 0.022-in, thick skin, and spacing of 0.10 in, would be required with 0.0045-in, thick skin.

But practical considerations ruled out the use of individual stiffeners that are spaced any closer than 3% in. This focused attention on miniature corrugations as a logical means of obtaining closely spaced stiffeners.

Final design of the tiny corrugations was a compromise between the theoretical and the practical. The corrugations are symmetrical—a necessity for the details of structural assembly. The 0.050-in, dimension of the flat face of each corrugation



**ONE HAND LIFT:** Jet tailpipe made from corrugated foil weighs 14.7 lb, replaces one fabricated conventionally that weighed 35 lb.



**LIGHT AND STRONG:** Engineers at Ryan Aeronautical Co. devised this technique for attaching a beam parallel to the corrugations.



**GOOD SOLUTION:** A portable, pencil-like spotwelder tip will reach into previously inaccessible spots to join corrugated sheets.

was dictated by welding requirements. Non-buckling up to a stress of 200,000 psi established the corrugation depth.

Just Three Sizes—The pitch was based on the non-buckling limits of a skin with twice the thickness of the corrugation material. And to avoid confusion, there had to be a limit on the number of standard sizes.

The three sizes finally chosen reflect careful consideration of all the factors involved. Corrugation No. 1 has a top gauge limit of 0.003 in. No. 2's top gage limit is 0.006 in., and a top gage limit of 0.009 in. applies to corrugation No. 3. Corrugations larger than No. 3 are not desirable because it is practical to use individual stiffeners for sheet more than 0.016 in. thick.

Design of a complete airplane should follow a smooth pattern of gradual transition from lightly loaded to highly loaded structures. Excess material should be avoided unless it is absolutely needed for strength and stiffness.

Makes Rigid Skin — Miniature corrugations, when welded to thin skin, can provide a very rigid surface covering for aircraft. The combination is rigid in one direction only and is very strong locally, although the corrugations are too shallow to have good column characteristics.

It is not practical, in most cases, to attempt to provide enough supports so that column length can be shortened for high-stress use. However, because the corrugation-skin combination has good bending stiffness in one direction, it can be used effectively to beam pressure loads to spars.

The company also foresees that the corrugated structure will be readily adaptable to integral fuel tanks. Seam welds or overlapping spot welds will make fuel-tight joints. Multiple spar construction will keep tension loads on the spots within safe limits, and final tank closure can be made by external fusion welding.

Assembly Not Hard-Assembly

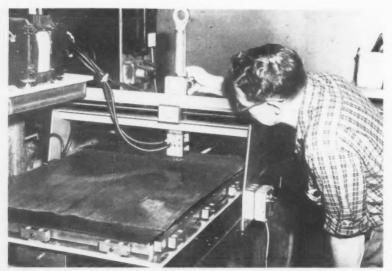
of structures built up from corrugated sheets has not presented any difficulties even though the gages run from 0.001 to 1.0 in. Such assemblies are easily built up from sub-units, and the only limitation on size is accessibility for welding.

Production spot welding of the corrugation to the skin can be done by using multiple welding units with a roller running in each corrugation. A certain amount of hand work is needed for final assembly. This can be simplified by careful design.

A variety of welding tips can be made for use in touch-up work, or for welding in places that are hard to reach. Good welds can be made consistently as long as clean, matched surfaces and correct machine settings are used.

Weld Sheets to Bar—The problem of welding thin sheet to heavy bar was solved successfully in the Ryan laboratory. There was only one limitation; the thin sheet had to be less than 0.016 in, thick. The bar can be an inch or more thick.

Fusion welding of 0,002-in. thick



FOR PRODUCTION: Multiple welding unit runs rollers in corrugations, spaces spotwelds evenly for joining skin sections.

foil has been done successfully, but better equipment is needed before this will become regular shop practice.

The company has not tried to anticipate or solve all of the problems that may arise in designing and building with high strength steel foil. General solutions are not too practical; problems on specific designs are better handled as they come along.

There is no easy way to make weight comparisons between the corrugated design and the more conventional skin-stringer or honeycomb designs. It can only be done by calculating the total material used in comparable designs intended for the same purpose.

Keeps Weight Low—But the designer can be sure his weight is at a minimum if: (1) he has achieved a taper effect in material that matches the applied load for his primary structure, and (2) his supporting structure contains the least amount of material needed to prevent buckling of the primary load members. He must also use a material with a high strength-to-weight ratio and be able to develop stresses near the yield strength of the material.

Ryan engineers have redesigned many existing structures to make use of the corrugated sheet. In every case, they achieved substantial weight savings. In several cases, weight of the redesigned structures was only half that of the original assembly. These changes involved structures which had originally been designed for aluminum and titanium, as well as steel. Some of the redesigned structures have actually been built.

For example, right and left hand panels that were formerly made with brazed honeycomb now have "Z" stiffeners made from 0.006-in. thick 17-7 steel. The "Z's" are welded to 0.010-in. thick 17-7 stainless skins at spacings of from 0.625 to 1.25 in. This represents a weight saving of 18 pct.

Firewalls Much Lighter — Firewalls have also been made from 0.002-in. thick, Type 321 stainless steel sheet welded to No. 1 corrugation made from the same material. This represents a weight saving of 60 pct over the 0.016-in. thick steel firewall originally planned for this job.

Another structure fabricated successfully is a lightweight steel tailpipe, 14 in. in diam and 12 ft long. It is made from 0.002-in. thick,

Type 321 stainless steel sheet welded to No. 1 corrugation of the same material.

The tailpipe cylinder is stiffened radially with steel ring bands that are 0.030 in, thick and 0.375 in, wide. These bands are approximately two feet apart. Total weight of the tailpipe is 14.7 lb, and it replaces a design that would have weighed 35 lb.

Expected Weight Penalty — Interestingly enough, when Ryan began its structural study three years ago, the company not only expected a weight penalty to accompany top performance in supersonic aircraft, it considered such a penalty justifiable. During the study, honeycomb, foam, posts and closely-spaced stiffeners were all carefully investigated.

The firm found that any of these methods is quite satisfactory from a stiffness standpoint and that temperature limitations are easily established. But because the weight penalty seemed to be too severe in every case, the study turned into a fight against weight.

Engineers reasoned that if weight is to be minimized, the entire structure must be considered, because (1) all attachments add weight, and (2) all non-structural materials, such as glue and core materials, add weight also. For example, a single glue line is equivalent to a sheet of aluminum 0.006 in. thick.

Logical Steps—This design philosophy — embracing minimum weight—leads logically to the use of very thin sheet. In turn, the problem of stiffening this thin sheet leads logically to miniature corrugations. Finally, the need for a great many points of attachment leads logically to spot welding for production assembly.

Thus high strength steel, used to its full strength potential, can either cut 25 pct off the weight of supersonic aircraft structures or enable the same weight to withstand temperatures up to 750°F.

# New Trays Cut Heat-Treat Cost

Do they stand up to long service? That's the question asked about units for holding parts during heat treatment.

Trays made of Inconel do just that. They even take repeated cycles through heat, quenching, and low temperatures.

• High-temperature corrosion is one of the toughest problems in heat treating. It led to the search by Fenn Mfg. Co.. Newington, Conn., for a better heat-resisting alloy to be used for trays. Fenn manufactures metal forming equipment, such as rolling mills, swagers, and wire drawing equipment.

It was a problem of having to replace trays used as stacking baskets in a 20- by 24-in, atmosphered pit furnace. Fenn found the answer in trays made of Inconel nickel-chromium alloy.

Lowers Heating Time—Made by Wiretex Mfg. Co., Bridgeport, Conn., the Inconel trays require 25 pct less heating time than the cast trays previously used. They are also about one-fourth lighter.

In spite of work loads of 150 lb per basket or 700 lb per load, there is little warpage. The combination of strength and low expansion permits 30 pet greater work load capacity.

Adding to the versatility of the baskets, Fenn uses them where the material is subjected to repeated heating and cooling cycles. The trays stand up to direct quenching in water or oil, as well as use in deep freeze units.

The alloy shows good resistance to carburization and excellent resistance to nitriding, as well as resistance to oxidation at temperatures up to 2100°F. Operating temperatures in this case range from 120°F below to 1825°F above.

Self-Stacking—The unit consists



**ALMOST LIKE NEW:** After more than 2000 hours of repeated heating and cooling, Inconel baskets show no distortion and little wear.

of a lifting fixture and five stackingtype baskets. The baskets have solid plate sides with a heavy wire-mesh screen resting on a removable grid bottom. The fixtures can carry more than five baskets at a time.

A larger unit is used in a 25- by 48-in. pit furnace. Here also, work loads have been increased 30 pct and heating costs cut almost one-third.

In designing baskets for similar operations, Wiretex engineers use as a measuring stick the cost per hour of service. After more than 2000 hours of use, the baskets show very little wear. Overall operating costs have dropped 20 pct.

# Gain Extra Space Through Good Handling

There's more than just a space problem in storing raw materials.

But so often, adding space is looked upon as the only solution to overcrowding.

Actually there's more to be gained by looking at handling techniques first. Proper choice can boost storage capacity and give added benefits in fast flexible handling.

 Lack of space is a problem that's bound to hit any plant. After all, increasing production with its demands for space is a sign of progress.

What happens when you run short? The first inclination is to start thinking about building. But even if there's room for expansion it's an expensive proposition.

Such was the problem at Excel Corp., Elkhart, Ind. Inadequate storage for raw materials was plaguing this producer of automotive windows and sash. It was a choice of building or of finding a better way to use existing space.

At this point the company found the answer by introducing fork trucks. Eight Towmotor trucks, built by Towmotor Corp., Cleveland, do a handling job that increases storage capacity 100 pct.

Along with the increase in storage goes a 50 pct boost in production. The fast flexible handling of the trucks releases 20 men for other duties.

Starts at Receiving Dock—Steel is supplied in rolls strapped 3 ft high, weighing 3000 to 4000 lb.

The glass arrives in crates 2 to 3 it high, weighing 600 to 1500 lb.

It used to take four to five men 4 hours to transfer a 40,000 lb load from semi-trailers with hand carts and mono-rails. With a fork truck one man can do the job in 30 minutes. Instead of tying up the carrier for 4 to 5 hours, the job is done inside of 45 minutes, easily avoiding demurrage.

Incoming stock is handled on flat wooden pallets 33 in. square. Trucks transfer the steel coils to an adjoining warehouse, a trip of about 50 to 100 ft. For glass storage, trucks carry the load 1000 ft to an elevator and then to a storage area on the second floor.

**Double Stack Height** — There's 3388 sq ft storage for steel coils, 4420 sq ft for glass. Under former



**EASY UNLOADING:** With short mast, fork truck fits under trailer roof for single-step unloading.



**DOUBLE STACKING HEIGHT:** High lift places 3700-lb load of metal stripping on top of 10-ft stack.

handling methods this was not enough.

Without adding space, Excel doubles its storage. Stack height for steel used to be 7½ ft. Fork trucks can stack to a height of 15 ft. For glass, the average stack height increases from 5 to 10 ft.

While the storage department itself has no trucks, each department uses its own trucks for handling in the storage area.

The production department has two trucks assigned. One handles raw materials and machinery. The other performs cleanup jobs, such as scrap removal, and assists in handling when needed.

Four or five men used to take 20 to 30 minutes to transfer stock on hand trucks. Now one man does the job in 5 to 10 minutes.

For storage inventory, the stock can be handled and regrouped in 2 days instead of 2 weeks as before.

Fast Changeover — Where production changes occur often as once a month, the trucks are a welcome addition. A changeover now only takes 10 to 20 minutes, where it used to take an hour or more. Instead of only one change at a time, additional changes can be made concurrently by simply adding more trucks.

The shipping department has one truck in use 10 hours per day. One man with a helper can load 260 boxes for shipment. With hand carts it used to take five men 4 hours to do the job.

With fork trucks it's possible to store outgoing shipments in the shipping room. The prior handling method required an extra transfer step from warehouse, a delay of 20 to 30 minutes.

**Tool Room Boost**—Die changing used to take 15 minutes with a hand cart, tying up two men on the job. Now one man can transfer a die in 5 minutes.

The truck for this use is fitted with a smooth platform with its surface lubricated for easy transfer of dies. The platform can carry three to four dies at a time.



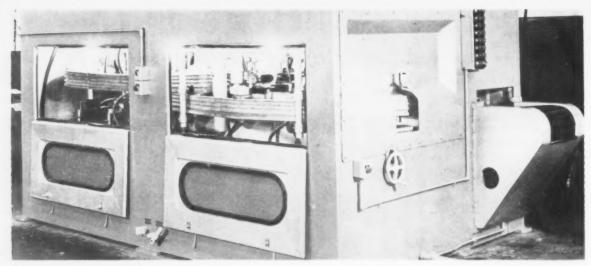
**FAST TRANSFER:** Operator in background backs load of glass from elevator. Load in foreground is headed for shipping dock.



**SHIPPING BOON:** Truck operator and his helper load 260 boxes in 20 minutes. It used to take five men 4 to 5 hours to do the job.



ONE-MAN DIE HANDLING: Heavy gage metal plate mounted on fork lift serves as platform for dies.



CLEANS IN ONE PASS: Two pairs of belts grip blades first at base then at top to get full coverage.

## Liquid Honing Speeds Precision Finishing

By T. M. Rohan-Cleveland Regional Editor

It's one thing to get a smooth finish. But it's quite another to do the job without altering critical tolerances.

Such is the case with titanium jet engine blades.

A new cleaning machine gets the job done by close control over the process and refinement in handling parts.

• Titanium jet engine blades must retain critical tolerances during removal of heat treat scale. A new liquid honing machine gets the cleaning job done at 320 blades per hour without disturbing metal.

The biggest innovations come in automatic handling of blades and in a new oscillating nozzle. Built by Lewis Welding and Engineering Co., Bedford, O., the new machine features an air-blasting gun fed by a variable-speed pump. With one operator this first machine at Thompson Products, Inc., Cleveland, does the work of several previous types.

Belt Handling—The machine operator hand feeds the blades, standing them up between a pair of soft rubber belts. The belts move the top half of the blades past the nozzles. Half way through, a second pair of belts grips the blades from the top so that the lower half and base get cleaned.

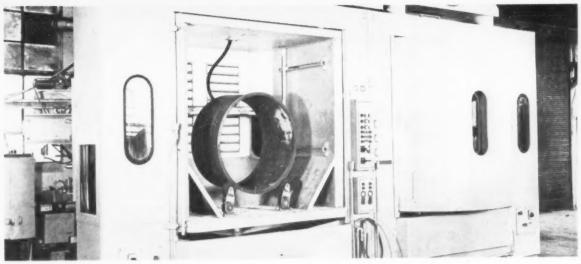
Cams raise and lower the belts to eliminate edge lines. Blades, cleaned to a finish of 12 to 14 rms, discharge onto a cross conveyor for washing and rinsing.

The cleaning unit meets stringent requirements. Blades have only a microscopic blue layer of corrosion from heat treating. But this layer must be removed over the entire surface without distortion, nicking, marking, or other injuries.

With blade tolerances at 0.002 in., the slightest nick or scratch is cause for rejection. As developed, the machine takes off only the scale so that blades can be put through several times without loss of metal.

Where one operator runs the new machine, previous types split up the work so that several operators were required. The blades had to be manually reversed in the holding mechanism and fed through twice.

Others in Service — The same type gun on other Lewis machines serves at Ford Motor's Chicago aircraft engine plant, General Electric, Borg-Warner, and Perfection Industries. At Cleveland Twist Drill Co. it removes wire drawing compound



DUAL PROCESS: As one cabinet gets loaded, 30-in part goes through 25-minute cycle in the other.

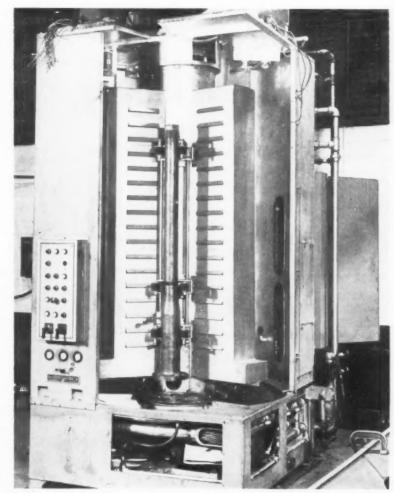
of beeswax and graphite from 0.015-in,-diam. wire.

At Ford, the unit cleans the inside and outside of a tube shaft every 17 minutes. Each shaft, 5 to 7 ft long and 5 to 6 in. diam., rotates around a nozzle which travels through it. The parts are loaded at one station, indexed to another for cleaning, a third for rinsing and then returned.

In another application, stainless after-burner parts rotate on drums for cleaning inside and out. A 30-in, burner part takes about 25 minutes. The cleaning units are mounted in pairs, so one is loaded while the other cleans.

Close Control of Mixture — In every unit the slurry can be supplied in any predetermined mixture. The air and water nozzle mounts in the gun body so that the relative position can be adjusted. There's selection in size of nozzle. Air pressure can be regulated independent of the slurry flow.

Volume of slurry flowing from the water nozzle can be separately regulated at the slurry pump. Different nozzle forms produce varying blast patterns as desired. In case of emergency stop or shutdown, all lines are purged to prevent blocking, surging, or settling of abrasive in the tank.



**INSIDE AND OUT:** Tubular work piece rotates as blast guns move vertically 6 ft. in controlled motion.



STARTING A CUT: Operator positions tracer to start multiple-head Travograph cutting through 158-in. plate.

## Flame Cutters Trace Fast Patterns

Multiple flame-cutting heads do speed unit output. But the key to production efficiency lies in ability to make fast set-ups.

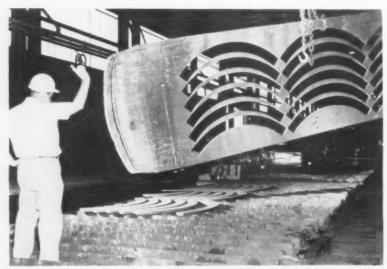
For cutting through plates, here's where a plant gets efficiency by combining the multiple-head units into one line.  Steel fabricating departments depend on versatility in preparing a wide variety of products. It takes equipment geared to meet changing requirements.

It's especially true where a plant produces steel products, ranging from ingots and plate to assemblies and end products. At Colorado Fuel and Iron Corp., Claymont. Del., flame cutting plays an important part in processing steel plate.

By joining 11 sections of standard 16-ft steel track, plus an 8 ft section. Colorado Fuel and Iron has integrated the flame cutting section into a single line 184 ft long. A series of four Airco Travographs, made by Air Reduction Co., New York, perform multiple-torch operations. The cutting tables accommodate a wide range of plate sizes and thicknesses.

Travel on Rails — The Travographs travel on two rails between the tracing tables and cutting tables. This permits easy positioning and repositioning for flame cutting heavy plate sections with a minimum of materials handling.

Typical is a six-torch setup cutting quarter sections of flange rings in 158-in, plate for tank cars. Cutting speed is 9 ipm with an Airco Electronic Tracer guiding the operating bar of a No. 50 Travograph. The tracing equipment gets an accuracy within a few thousandths of an inch.



**EFFICIENT PROCESS:** The in-line arrangement speeds setting up and eases materials handling.



New ELPAR R-10 series fork truck.

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## New Catalogues And Bulletins

#### Steam Jet Ejectors

Steam jet ejectors are described in a folder. Available in a wide range of sizes with single and multiple stages, these ejectors help firms meet vacuum requirements. (Southwestern Engineering Co.)

For free copy circle No. 1 on postcard, p. 117

#### **Seamless Tubing**

High temperature strength properties of Croloy 16-13-3 (TP316) seamless tubing are analyzed in a Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 117.

technical data report. It relates results of short time tensile and creep rupture tests made at heats to 1500°F. (Tubular Products Div.. Babcock & Wilcox Co.)

For free copy circle No. 2 on postcard, p. 117

#### Twin Arc-Welder

Seven ways you can profitably use a diesel arc-welder are discussed in an 8-page booklet. It includes brief case histories of actual on-the-job savings. (Caterpillar Tractor Co.) For free copy circle No. 3 on postcard, p. 117

#### Refractories

Bonding mortars for refractories are reviewed in a 6-page bulletin. It covers: recommended maximum use temperatures, fusion, types of set. form, pounds required per 1000 bricks for troweling, dipping and brushcoating, etc. (J. H. France Refractories Co.)

For free copy circle No. 4 on postcard, p. 117

#### Machine Maintenance

Machinery maintenance is discussed in a 4-page booklet. It concerns systems which reduce costs of maintaining machinery and quality control units. (International Research & Development Corp.)

For free copy circle No. 5 on postcard, p. 117

#### Mill Motor

Design features of a 620-frame mill motor are detailed in a 4-page bulletin. It relates electrical details, including design and construction of armature, armature coils and field coils. All coil insulation is Class H. (Elliott Co.)

For free copy circle No. 6 on postcard, p. 117

#### **Scrap Presses**

Scrap-metal baling presses of standard and special designs appear in a 6-page folder. These presses gather, crush and bale large loads in one sweeping, rapid cycle. (Chattanooga Welding & Machine Co.)
For free copy circle No. 7 on postcard. p. 117

#### Zirconium, Alloy

Zirconium and a related alloy are covered in a bulletin. It lists specifications of foil and strip as a single material, or clad with invar or stainless steel. Reviewed are zirconium rod, wire and unusually shaped profile-rolled stock. The

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Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Hendrick Wedge Wire Screens • Architectural Grilles • Mitco Open Steel Flooring—Shur-Site Treads • Armorgrids • Hydro Dehazers • Petrochemical Column Internals brochure also deals with other rolled materials, including hafnium, pure beryllium, vanadium, tantalum and manganese alloys. (General Plate Div., Metals & Controls Corp.)

For free copy circle No. 8 on postcard, p. 117

#### Solid Film Lube

Good adhesion, abrasion resistance and elasticity are valuable features of an all-purpose solid film lubricant. A 4-page bulletin describes the high load carrying lubricant, which is about 90 pct molybdenum disulphide and 10 pct graphite by weight. (Electrofilm, Inc.)

For free copy circle No. 9 on postcard, p. 117

#### Lead, Its Uses

Leaded porcelain enameled extruded aluminum sections and other lead products are discussed in a publication. It reviews actual applications of red lead paint, radiation shielding, piping and other items containing lead. (Lead Industries Assn.)

For free copy circle No. 10 on postcard, p. 117

#### Radioisotopes

Industrial applications of radioisotopes are briefly reviewed in a special report. It explains how these by-products of nuclear fission can cut costs and improve product quality. The report deals with: (1) industrial research; (2) radiography; (3) gaging; (4) tracers; (5) ionizers; (6) polymerization; (7) radiation light sources. (Machinery & Allied Products Institute).

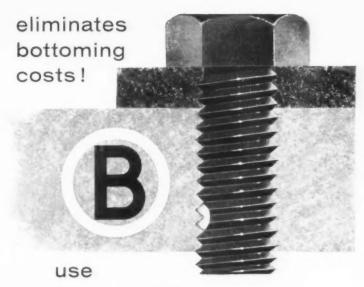
For free copy circle No. 11 on postcard, p. 117

#### Corrosion

Corrosion of ferrous tubing in refinery service is discussed in a dozen-page bulletin. (Tubular Products Div., Babcock & Wilcox Co.)
For free copy circle No. 12 on postcard, p. 117

#### **Automatic Welding**

Machinery for automatic welding is featured in a 4-page folder. It lists advantages and gives details of: multi-purpose machines and



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positioners, automatic chucking, automatic travel and automatic ejection units for all welding processes. (Airline Welding Sales, Inc.)

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#### **Electric Trucks**

"Simplified Electricity for Electric Industrial Trucks" is the title of a bulletin. It presents a 2-page course in battery power fundamentals in an effort to prove the subject is simple and easy to understand. It's a good, interesting, basic work on this type power. (Exide Industrial Div., Electric Storage Battery

For free copy circle No. 11 on postcard, p. 117

#### **Ball Bearings**

Crowded with informative tables, a folder deals with precision bearings. These have solid, one-piece inner and outer races machined of high quality-steel, carefully heat treated and hardened. Illustrations show many types available from one maker. (Schatz Mfg. Co.)

For free copy circle No. 15 on postcard, p. 117

#### **Digital Computer**

A 4-page folder analyzes a digital control computer. It tells why this computer is excellent for: (1) automatic control of continuous and batch processes; (2) logging of process data; (3) pilot plan operation and process research; (4) test facility operation; (5) general computational use. (Ramo-Wooldridge

For free copy circle No. 16 on postcard, p. 117

#### Valves

A 56-page catalog aims to aid persons selecting valves. It lists leak-proof valves for oil or water pressures from 0 to 250 psi, 0 to 1500 psi, 0 to 3000 psi, 0 to 6000 psi and 0 to 10,000 psi. Also covered: air-pressure valves, solenoid valves, standard and explosion proof. (Barksdale Valves).

For free copy circle No. 18 on postcard, p. 117

## SPECIAL REPORTS ON FINISHING NON-FERROUS METALS

#### NUMBER I—Decorative, Corrosion-Resistant Finishing with Iridite

Chromate conversion coatings are well known and accepted throughout industry as an economical means of providing corrosion protection, a decorative finish or a good paint base for non-ferrous metals. However, continued developments are so rapid and widespread that many manufacturers may not be completely aware of the breadth of application of this type of finish. Hence, this digest of current information; to bring you up to date on the many ways in which you can combine salable appearance with durability in one finish at a competitive price advantage. Report II on paint base, corrosion-resistant finishes and Report III on chemically polished, corrosion-resistant finishes are available on request.

First, as a basis for this discussion, a "decorative" finish is considered as any chromate film that is used as a final finish in itself. It may be truly decorative in that its sole purpose is to enhance the beauty of the product. For example, a bright chrome-like finish or a pleasing bronze appearance are among the many effects that can be obtained. It may be functionally decorative in that it reduces reflectivity for camouflage purposes or provides a means of color-coding parts. But, in all cases, the Iridite films protect the metal against corrosive attack.

Iridite finishes are now available for all commercial forms of the more commonly used non-ferrous metals, including zinc, cadmium, aluminum, magnesium, silver, copper, brass and bronze. These films can produce a wide variety of pleasing appearances. The basic colors of the Iridite coatings are grouped below by metals.

ZINC and CADMIUM: Metallic bright, light iridescent, iridescent yellow, bronze, olive drab.

COPPER, BRASS, BRONZE: Metallic bright, yellow.

ALUMINUM ALLOYS: Clear, iridescent yellow, brown.

MAGNESIUM ALLOYS: Light brown, dark brown, black.

SILVER: Metallic bright.

In addition, many films can be modified by bleaching or by dyeing. Among the dye colors available are various shades of red, yellow, green, blue or black.

Depending upon the metal and the Iridite used, corrosion resistance of clear and bright films ranges from mild passivity to as high as 500 hours in salt-spray; on heavier dark films, salt-spray resistance ranges from approximately 100 to 1000 hours.

It is this combination of decorative and corrosion resistant properties that accounts for the widening use of Iridite finishes. For example, Iridites #4-73 and #4-75 (Cast-Zinc-Brite) make possible for the first time, a combination of lustrous chemical polishing of the as-cast surface of zinc die castings and good resistance to corrosion. Further, in many cases,

#### WHAT IS IRIDITE?

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002" max.) gel-like, complex chromate film of a non-porous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

sizeable savings in the cost of buffing and electroplating are realized.

On many steel parts, a simple system of zinc or cadmium plate and bright Iridite is used instead of more costly electroplated finishes to provide a bright, decorative and protective finish with tremendous savings in material, equipment and labor.

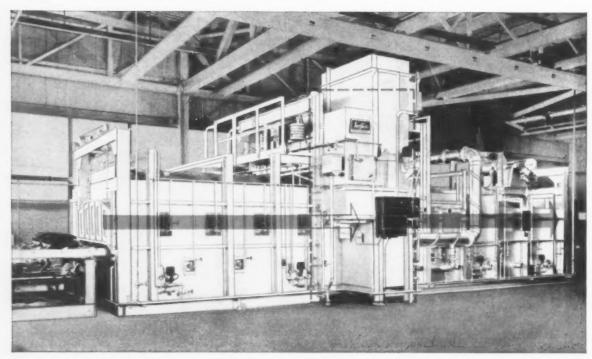
In finishing aluminum, where corrosion resistance or paint adherence is the prime consideration, the aircraft industry has all but abandoned the anodizing process in favor of recently developed chromate conversion coatings, among them Iridite #14 and #14-2 (Al-Coat). These formulations and their method of application can be varied to retain the original metallic appearance while providing acceptable corrosion resistance, or to produce a fully colored brown finish that offers exceptional corrosion protection. Again, time and manpower savings are astounding—one company saved at least \$15,000 a year on maintenance of racks alone and another \$40,000 on materials and labor in only nine months. In addition, of course, hundreds of thousands of dollars are saved by eliminating the need for expenditures for generators, heating equipment and racks.

Iridites are widely approved under both Armed Services and industrial specifications because of performance, low cost and savings of materials and equipment.

In planning or designing, you should consider the many other characteristics of Iridite finishes which may enter into the specific problem. In addition to having decorative and protective functions, these chromate coatings form an excellent base for organic finishes and bonding compounds. They have low electrical resistance. Some can be soldered and welded. The Iridite film itself does not affect the dimensional stability of close tolerance parts.

You can see then, that with the many factors to be considered, selection of the Iridite best suited to your product requires the services of a specialist. That's why Allied maintains a staff of competent Field Engineers—to help you select the Iridite to make your installation most efficient in improving the quality of your product. You'll find your Allied Field Engineer listed under "Plating Supplies" in your classified telephone book. Or, write direct and tell us your problem. Complete literature and data, as well as sample part processing, is available. Allied Research Products, Inc., 4004-06 E. Monument Street, Baltimore 5, Maryland.

## Superfast cooling for cycle annealing



A furnace-within-a-furnace makes this Surface cycle annealer one of the most versatile heat treat units in the country. It anneals, cycle anneals, and normalizes gear forgings of different size, shape, and alloy at the net rate of 864,000 lbs. per month or better.

Such exceptional versatility is achieved by a superfast cooling zone. Really a full convection furnace within a direct-fired furnace, this zone is isolated by refractory doors. It can be used or by-passed, depending on which of many cycles the customer wants. As a result, the customer can heat treat as many as 13 different alloys in this one furnace.

Adding to the flexibility of the furnace is a modular tray design. Each module is an 18x20-inch chrome alloy casting. Modules can be combined to hold any size of work up to 800 pounds. They are also used to carry work outside the furnace.

This furnace-within-a-furnace is another proof that Surface engineers are old hands at creating new ideas in heat treating.

Write for Bulletin SC-146 on cycle annealing.

Surface Combustion Corporation, 2373 Dorr St.,

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Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

#### Turret Drill

Automatic, hydraulic turret drills are featured in a dozen-page brochure. It covers 6 and 8-spindle machines with infinitely variable pre-selective hydraulic feed control. (Burg Tool Mfg. Co.)

For free copy circle No. 19 on postcard

#### Plant Location

Looking for a new plant site? If so, you can profit by getting all the available facts on potential locations. A comprehensive brochure points out that you shouldn't overlook the established industrial area known as Metropolitan Reading, Berks Co., Pa. The booklet shows this region has plenty to offer in labor, power and other resources. It's right in the middle of one of the world's biggest markets, too. (Greater Berks Development Fund).

For free copy circle No. 26 on postcard

#### Cast Parts

Why cast parts produced by one steel foundry have exceptional design versatility is explained in a 4page folder. It tells why these steel castings possess dimentional accuracy, surface smoothness, and internal integrity. Sand, shell, ceramicmold, and centrifugal castings are covered and facilities for making them described. (Lebanon Steel Foundry).

For free copy circle No. 21 on postcard

#### Lift Tables

Self-contained lift tables for simplifying lifting, feeding and workpositioning operations are described in an 8-page booklet. These lift tables are very portable, easy to install. They have no superstructure; this assures free access to the work load from all angles, at all levels, at all times. Tables have many uses in shops, plants, warehouses, etc. (Southworth Machine Co.)

For free copy circle No. 22 on postcard

#### Time Delay Relays

A bulletin describes a new line of subminiature, hermetically sealed time delay relays. (A. W. Haydon Co.)

For free copy circle No. 23 on postcard

#### Crawler Tractors

Pocket-sized, a catalog includes information on turbo-charged diesel powered crawler tractors and motor scrapers. Another folder, four pages. lists accessories and attachments for the maker's motor graders. (Allis-Chalmers Mfg. Co.)

For free copy circle No. 24 on postcard

#### **Electric Motors**

Features of large high-speed synchronous motors are given in an 8-page bulletin. Company services that go with use of the 1500-hp and up motors are also described. (General Electric Co.)

For free copy circle No. 25 on pestcard

#### Industrial Trucks

A truck engineering bulletin shows how a new bearing extractor unit works. This attachment does four things: (1) removes couplings; (2) removes bearing chocks; (3) replaces bearing chocks on reground work rolls; (4) replaces couplings. (Elwell-Parker Electric Co.)

For free copy circle No. 26 on postcard

#### Wire Products

Iron, steel and nonferrous wire products for many applications are covered in a 6-page folder. A handy gage table is included. (Riverside-Alloy Metal Div., H. K. Porter Co., Inc.)

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#### Steel Strapper

Rapid and conveniently, a power metal-strapping unit feeds vertical Postcard valid 8 weeks only. After that use own letterhead fully describing item wasted. 2/6/58

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#### FREE LITERATURE

straps around large packages or skip loads. In many cases it eliminates need for a "back man" or helper to assist the strapping operator. (Signode Steel Strapping Co.)

r'or free copy circle No. 28 on postcard

#### Nitrogen Generator

Self-contained packaged nitrogen atmosphere generators are reviewed in a four-page bulletin. (Gas Atmospheres, Inc.)

For free copy circle No. 29 on postcard

#### Induction Melting

A data sheet tells how a particular selector switch design cuts installation, operation and maintenance costs. Such switches carry the high currents that exist in induction melting equipment. (Inductotherm Corp.)

For free copy circle No. 30 on postcard

#### **Bearing Material**

Bearium metal's advantages as a bearing material are described in a folder. In addition, it provides data on a gruelling test of the material. (Bearium Metals Corp.)

For free copy circle No. 31 on postcard

#### Infrared Heating

High - efficiency, quartz - infrared heating elements are illustrated in a 4-page folder. Featuring fast heat-up and uniform radiation, the units come in all voltages, up to 84-in. long. (Quartz Products Corp.)

For free copy circle No. 32 on postcard

#### **Metal Stitching**

Metal stitching, a new fastening idea, is detailed in a 16-page book-let. Covered is stitching of metal to metal or metal to nonmetallic materials. (Acme Steel Co.)

For free copy circle No. 23 on postcard

#### Diversification

All activities of a diversified corporation are reviewed in a 28-page brochure. Briefly explored are division for: pelletizing, steel mill work, heat treating, glass, engineering, boilers, air conditioning and drying, aircraft, heating. (Surface Combustion Corp.)

For free copy circle No. 34 on postcard

#### Hydraulic Fluids

Selection, operation and maintenance of machinery using hydraulic fluids are discussed in a 24-page bulletin. It covers characteristics (pro and con) of petroleum base and fireresistant hydraulic fluids, tells how to pick best fluid for a particular job. (Vickers, Inc.)

For free copy circle No. 35 on postcard

#### High-heat Alloys

Two 28-page properties booklets deal with: (1) a wrought cobalt-base high-temperature alloy; (2) a nickelbase high-temperature alloy in wrought or cast form which has high oxidation resistance up to 2200°F. (Haynes Stellite Co., Div. of Union Carbide Corp.)

For free copy circle No. 36 on postcard

#### Wrought Iron Pipe

Wrought iron piping case histories appear in an 8-page brochure. They point up wrought iron's durability under many conditions. (A. M. Byers Co.)

For free copy circle No. 37 on postcard

#### Hole Punching

Unitized tooling for hole punching in presses and press brakes is illustrated in a 20-page booklet. It includes fundamentals, potential economies of this equipment for perforating and notching. (Punch Products Corp.)

For free copy circle No. 38 on postcard

#### Force Control Switch

Force control switches, outlined in a bulletin, control mechanical forces at various load points. They can be easily set up to control motors, illuminate remote control signals, or operate warning devices automatically with split-hair accuracy, the bulletin says. (W. C. Dillion & Co., Inc.)

For free copy circle No. 39 on postcard

Buying stainless steel plate from Jessop is like owning your own mill

When you order from Jessop you don't wait in line. Jessop operates a compact, highly adaptable stainless plate department-all under one roof from melting to finishing. Production schedules can be adjusted overnight to suit your need. Moreover, with the 3rd largest stainless plate mill in the country now in operation, sizes are available up to 80" in width and 240" in length. And Jessop's yearsahead chemical control equipment quickly identifies tramp elements in the molten bath-permits their removal so you will enjoy improved forming and welding characteristics in the finished plate. You'll find it will pay to send your next inquiry to Jessop where doing business is like owning your own mill.

To: JESSOP STEEL COMPANY

antity in King William

2 × 400 × 20

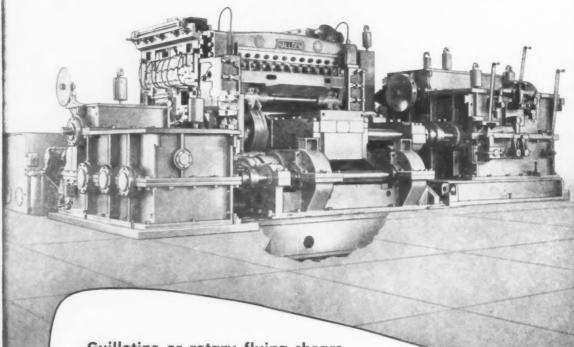
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STEEL COMPANY . WASHINGTON, PA.

PFFICES IN PRINCIPAL CITIES

Whelly-owned Subsidiants: Jessop Steel of Canada Limited, Wallaceburg, Toronto Jessop Steel International Corp., Chrysler Building, New York, New York Green River Steel Corporation, Owensboro, Kentucky

## SYNCHRONIZED "On the Fly"



Guillotine or rotary flying shears are now designed for synchronization adjustment without stopping the machine.

Automatic Shears

designed and built by

HALLDEN THE SHEARING SPECIALISTS

THE HALLDEN MACHINE COMPANY . THOMASTON, CONNECTICUT

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The Wean Engineering Co., Inc., Warren, Ohio T Edward Dodds Co., Pittsburgh, Pa. W. H. A. Robertson & Co., Ltd., Bedford, England M. Castellivi Inc., New York, N. Y.

## Big Setup Corrugates Long Steel Sheets

Bringing bigger equipment and new die patterns into the plant lets a corrugated sheet fabricator up its capacity.

And it makes end products up to 60 pct stronger, too.

• Thanks to a huge new sheet steel corrugating setup, a major producer will soon begin fabricating 21-ft 6-in. long sheets instead of the present 14-ft 4-in. ones. Thus the fabricator will be able to turn out a wider variety of roof and floor construction sheets than is now possible.

In use at Granite City Steel Co., Granite City, Ill., the new corrugator stands 15-ft high. It weighs about 300,000 lb. Its upper and lower mandrels are 21-ft 6-in. long; each mandrel weighs 36 tons. Mounted on each mandrel are three different patterns of corrugating dies. With such a setup, the corrugator can produce several different products with no necessity for changing dies.

Uses Precision Dies—Development work for the new corrugator dies was done on a pilot corrugator at subsidiary Granco Steel Products Co.'s research laboratory. De-

#### Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 117. Just indicate the page on which it appears. Be sure to note exactly the information wanted. sign work was done by Granite City Steel's own engineering department. Dies are made of close-grained semi-steel machined to 0.002-in, tolerances.

The new die patterns give the fabricator's products from 33 to 60 pct greater strength than previously by making more effective use of its steel.

A 100-hp Motor Runs It—Built by Stamco, Inc., New Bremen,



This machine corrugates  $21\frac{1}{2}$ -ft long sheets of steel.

Ohio, the huge machine is powered by a 100-hp dc motor through a gear reducing box; this powers the top roll as well as the bottom one.

Steel sheets feed into the corrugator from a feed table. Brightly colored hooks or "dogs," into which new sheets are placed, move across the feed table toward the corrugating rolls. If the sheet is placed in the red hooks, it feeds through dies which form corrugated roof deck materials. If it is placed against white or orange hooks, other products are fabricated.



## and HOISTS

## Look Overhead... See "NORTHERN"

"NORTHERN" — the name you see on overhead electric cranes in industrial plants of all kinds wherever you may be, because NORTHERN — since 1899 — has been a leader in industrial crane design and construction.

The name "NORTHERN" represents faithful adherence to uncompromising design, quality controlled machining, and closely inspected fabrication. "NORTHERN" Cranes and Hoists have an extra margin of safety — give dependable, fast service under the most rugged, emergency conditions — are notable for fine, standard-type electrical equipment and controls for precise manipulation and quick, easy maintenance with minimum downtime.

Let us send you Crane Bulletin SE-108-A Hoist Bulletin H-112

#### NORTHERN ENGINEERING WORKS

210 CHENE STREET DETROIT 7, MICHIGAN



#### TECHNICAL BRIEFS

Solves A Problem—One problem was encountered — and overcome. This was elimination of all "play" in these hooks. Thus, both ends of a sheet would be fed into the rolls at exactly the same time.

The corrugator contains a specially-conceived hydraulic system which permits the top corrugating roll to be raised or lowered. While the bottom roll remains stationary, the top roll may be raised as much as  $2\frac{1}{2}$  in, above the point at which gears mesh, or lowered  $\frac{1}{2}$  in, below this point.

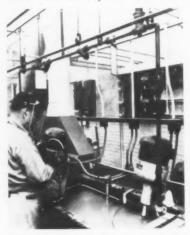
#### Firm Neutralizes Waste And Conserves Water

At a large instrument maker's plant, pH control in the acid bright dip installation conserves water and neutralizes acid wastes before they are discharged into the municipal sewage system.

Many soldering operations are necessary at Leeds & Northrup Co.'s North Wales, Pa. plant. For it's here that the firm turns out all of its Speedomax recorders. Before parts of these instruments are joined, they must be free of grease, dirt or oxides. To get rid of these, the company cleans the parts by the bright dip process.

Dip Parts In Acid—The company first loads parts into a stainless steel basket. It dips these into a hot sulfuric acid bath; then they go into a cold 50-50 mixture of sulfuric acid and nitric acid. After the baths, dipping the basket into three water rinses—two cold, one hot—removes acid.

Two conditions had to be met before the bright dip process was installed. One was the need to minimize the amount of make-up water used to keep the rinse water



After repeated rinses, water in this tank gets acid-laden.

sufficiently neutral. The common way to neutralize water baths is run a continuous flow of water through the tank. However, this was not practical at North Wales. Water supply from the firm's own wells is too limited. Borough water is too expensive to allow such free usage.

The second requirement was that effluent had to be neutralized to a legal pH level before it could be discharged directly into the borough sewage system.



Time after time, men who know metals specify SPENCER blowers . . . on original equipment or for replacement.

On this fully automatic pusher type heat treating furnace (product of Surface Combustion Corporation) a Spencer 1507 blower delivering 700 c.f.m. at 24 oz. pressure supplies air to burner tube eductors for controlled combustion.

Considerations in selecting a blower for this new Surface furnace were: constant pressure, dependable operation, long service life. Spencer was specified.

Whatever your need in blowers, from 1/3 to 1,000 H.P., volumes up to 20,000 C.F.M., pressures from 4 oz. to 10 lbs., it will pay to check with SPENCER.

Request catalog 126-A Containing complete specifications.



OTHER QUALITY
SPENCER PRODUCTS







Meets All Demands - Both requirements were met in the system designed by the company's own application engineers. They solved the make-up problem by a system that continuously measures conductivity in each of the cold rinse tanks. Two controllers are used. When either bath becomes too acid. its controller opens a solenoid valve in the make-up supply line. This adds water and brings the acidity back into line. By adding make-up only when needed, instead of continually, this system holds water consumption to a minimum.

To solve the problem of how to neutralize process effluent, the engineers conducted controllability analysis. They studied such factors as allowable pH limits, flows, and tank capacity requirements.

Neutralizes Acid - Based on results of the analysis, they developed a system that effectively neutralizes process effluent. Before acid rinse water discharges into the sewer lines, it flows into a 6 x 3 x 2-ft retention tank installed behind the rinse tanks. Here, pH is continuously detected by a stainlesssteel-mounted dip-type pH electrode assembly. This translates pH into a proportional millivolt output.

The electrode output feeds to an industrial-type continuous pH indicator which amplifies the voltage and feeds it to a recorder-controller. This instrument plots a 24-hr record of effluent pH. In addition, it feeds a control signal to a valve drive mechanism which regulates the addition of caustic soda to the rinse water in the retention tank. Mixers agitate the solution so that the caustic soda reagent evenly distributes in the tank to bring the pH of the final effluent to a legal level of 7.5.

#### Hardens Pieces Fast

Approximately 500 13-in. shock absorber shafts per hour are being hardened with each of three 40-kw induction heaters at the Monroe Auto Equipment Co. plant at Hartwell, Ga.

The hardening process is per-



Duraloy High Alloy Casting Service...



We are now in position to accept and process substantial orders for shell-molded castings in the Chrome Iron, Chrome Nickel class.

Shell-molded castings provide several values over conventional castings:

a . . . dimensions are exceptionally accurate

b . . . thinner walls are practicable

c . . . surface finish is superior

Shell-molding is ideal for mass or repetitive production of parts particularly those with intricate design.

With our conventional static and centrifugal casting service now broadened by our shell-molded casting service, we are in a better

position than ever to serve industry in connection with its high alloy casting requirements. May we quote on your casting requirements that call for shell-molding?



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IN THE BEATTY FAMILY
OF FINE METAL-WORKING
EQUIPMENT YOU'LL
FIND MACHINES FOR
BENDING Z STRAIGHTENING — SHEARING —
FLANGING T V-BENDING Y PRESSING —
AND NOTCHING Y



BEATTY No. 7 Detail Flange Punch speeds single hole flange punching; eliminates end-for-end turning of beams. 100-ton cap.



BEATTY Guillotine Bar Shear for angles, bars, rounds, squares without changing tools.



BEATTY Guillotine Beam Flange Punch for flange punching of beams. Built-in adjustable tools save set-up time. 200 ton cap.

Got a metal-working problem? Chances are, from the Beatty family of metal-working equipment you will find the *right* machine for the job. Right in cost... right in production speed... right in engineering concept.

Beatty machines have an enviable reputation for accurate, dependable, day-inday-out operation. They're built rugged and rigid to keep downtime at a minimum—boost production. Don't let obsolete equipment rob you of production and profits. Get all the information on a Beatty installation to fit your needs . . . talk it over with a Beatty engineer.

### BEATTY MACHINE & MFG. CO.



BEATTY Guillotine Beam Punch punches webs and flanges in I-beams from 6 to 30 inches.



BEATTY Gap Type Press for forming, bending, flanging, pressing, 250 ton cap.

#### TECHNICAL BRIEFS

formed on an almost completely automated assembly line. Induction heating equipment was supplied by General Electric Co., Shelbyville, Ind.

Take Less Space — The new equipment requires far less floor space than formerly used equipment, according to the user. In addition, the firm says the old process required more manpower and was a batch-type operation.

To conserve floor space with the induction heater, the heater, heat exchanger, and voltage regulator are installed on a platform over the assembly line. A transmission line runs from this balcony to the line below connecting to an output transformer on the floor.

In manufacturing the equipment, parts are formed on a screw machine. They pass through a centerless grinder, an induction heater fixture, a water quench, two additional centerless grinders and finally through a lapping machine. The line requires only one operator to feed stock into the screw machine at one end and an operator to check the finished parts as they emerge from the lapping machine.

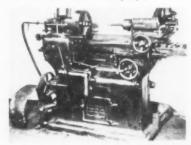
#### Firm Rebuilds Antique Grinding Machine

There comes a time when every rule—no matter how hard or fast—meets its exception. And the one that says new equipment pays for itself in time is no exception. Though you can pretty nearly be certain that if you shop carefully and evaluate your own needs, new equipment will indeed save you money in the long run, you might possibly benefit by the example of a large pump maker.

This manufacturer ran head-on into such an exception. A No. 70 Heald internal grinder close to 50 years old helped the company turn over a profit through many years. Its days were numbered. In fact, even though the firm had similar

machines rebuilt in the past with success, this one was so worn-out purchasing men started looking for a new unit.

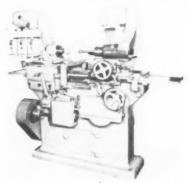
Make It Do? — The company made a quick appraisal of the situation, then a careful study. The conclusion: the grinder must somehow be rebuilt. Older employees were



This machine had indeed seen a lot of shop service.

used to this type and they wanted it. Moreover, a number of these machines were still in use; production capacity was comparatively high.

This particular machine made the problem more complex. It was so completely worn out that the bed had an 0.030-in, hollow in the center. Remaking the bed, moreover, would severely throw out of alignment all the mating parts. The gears were so badly worn as to have a knife edge. Bearings were in need



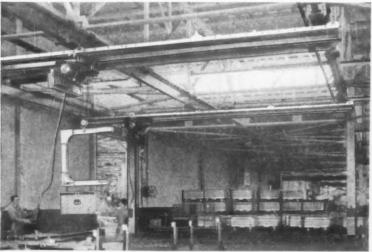
After rebuilding, the grinder looks almost like a new one.

of replacement, and the machine was driven by a counter-shaft. The problems were indeed many. Not giving up, the firm called in Jem Machinery Co., Inc., Belleville, N. J., for advice.

Get A New One—After discussing the grinder with the manufacturer, Jem representatives pointed out that the rebuilding cost could easily cover the purchase of a more modern used machine. However, all that is important in a shop is not machinery. The pump maker insisted that rebuilding would serve his purpose better.

The rebuilder undertook this task. After a careful search, a simi-

lar machine of this vintage was located for use to replace key parts no longer available from Heald. The outside firm approached the motorization from a new viewpoint; it designed and incorporated motor support units with spring tension idlers added inside the support. This completely eliminated the "Christmas tree" jackshafts previously used. The wheelslide was remade to give proper center distance for modern grinding spindles.



Courtesy Fisher Body Division, General Motors Corporation

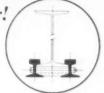
### 92 ABELL-HOWE CRANES

#### for automobile body builder!

Specifically, seventy 10-ton cranes, ten 5-ton cranes and twelve 2-ton cranes... serving the receiving, production facilities, storage, maintenance and repair, and shipping areas in two separate plants.

The entire job was completed in good order—equipment was accepted promptly upon completion, and there have been no reported cases of malfunction.

Granted, Abell-Howe does not write orders like this every day. In fact, our business has been built on the satisfaction of single crane buyers. Point is, these cranes were purchased in quantity simply because Abell-Howe has the quality construction as well as the conservative price!



Abell-Howe 10-ton crane bridges at Fisher Body are specially designed with Timken bearing equipped flat tread wheels operating on 160# ASCE crane rails fastened to lower flange of 1-beam runways no better design for heavy service!

#### SEND FOR BULLETINS



5-108 SINGLE GIRDER CRAMES
Underhung and Top-Running models. Cap.
2,000 to 10,000 lbs.

C-108 CRANEMASTER CRANES
4 basic types to suit all building conditions



7747 W. Van Buren St. Forest Park, Ill.

## Caulking Compound Is Very Flexible

Here's a caulking material that improves its properties as time passes. Unaffected by weather, it also resists some chemicals.

It's permanently flexible and ductile at temperatures from —30 to 165 F and sticks to just about any surface.

 Long pot life and adherence to just about any surface are two key advantages claimed for a black putty-like compound. For use in most caulking applications, the material, when mixed and applied, gradually turns into a soft rubber.

According to Dittbrenner Associates, Inc., Rockaway, N. J., the material not only has long application life, but it actually improves its caulking properties as it ages. Actual field tests show it doesn't shrink appreciably, dry out, get hard, flow under a hot sun, embrittle in zero weather, or lose its adhesion or flexibility.

Resist Wide Temperatures— Easily mixed, the compound can be applied with a caulking gun. It doesn't turn into an unworkable solid mass at any time. Meticulous surface preparation is unnecessary; it'll adhere even to wax, polyethylene or Teflon.

Hand mixing of small quantities is practical, its developers say. They point out that mechanical mixing, properly done, results in a more complete mix and faster cure, however. This is the only difference, though, between a good hand mix and mechanical mixing.

The material is permanently flex-

ible and ductile at temperatures from —30° to 165°F, the firm points out. Experimenters report that the compound keeps both its elasticity and bond for so long that all accelerated aging and weathering tests administered so far have failed to indicate just when it would eventually deteriorate. In the oldest application, slightly under four years, its physical properties are not only completely intact, but they are better now than at the time of application.

## Stainless Casting Cuts ICBM Cost

A cast stainless valve is now in use with the Atlas intercontinental ballistic missile. Having met rigorous military specifications, the part costs 30 pct less than previously considered designs. Even more important, the casting design has certain inherent assets.

Working under contract to the Air Force. Convair-Astronautics, San Diego, Calif., employs the valve in a line running to a high pressure gas tank. By shutting the valve, the line below it can be cleaned without depressurizing the tank. In this service, the valve and valve body are exposed to corrodents at a wide

#### Want More Data?

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MEEHANITE CASTINGS ARE MADE ONLY
BY MEEHANITE FOUNDRIES

The American Laundry Machinery Co. Rochester, N. Y. Atlas Faundry Co. Detroit, Mich. Banner Iron Works, St. Louis, Ma. Barnett Foundry & Machine Co.

Irvington, N. J.
Blackmer Pump Co., Grand Rapids, Mich.
E. W. Bliss Co., Canton and Toledo. Ohio
Centrifugally Cast Products Div., The
Shenanga Furnace Co., Daver, Ohio
Compton Foundry, Compton, Calif.
Continental Gin Co., Birmingham, Ala.
The Cooper-Bessemer Corp.,
Mt. Vernon, Ohio and Grave City, Pa.,
Crawford & Doherty Foundry Co.,

Crawford & Doherty Foundry Co., Portland, Ore. Empire Pattern & Foundry Co., Tulsa, Okla.

and Banham, Texas Florence Pipe Foundry & Machine Co., Florence, N. J.

Fulton Foundry & Machines Co., Inc., Cleveland, Ohio

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Koehring Co., Milwaukee, Wis.
Lincoln Foundry Corp., Los Angeles, Calif.
Nordberg Manufacturing Co.,

Milwaukee, Wis and St. Louis, Mo. Palmyra Foundry Co., Inc., Palmyra, N. J. The Henry Perkins Co., Bridgewater, Mass. Pohlman Foundry Co., Inc., Buffala, N. Y. The Prescatt Co., Menaminee, Mich. Rosedale Foundry & Machine Co., Pittsburgh, Pa.

Ross Meehan Foundries, Chattanooga, Tenn.
Sonith Industries, Inc., Indianapolis, Ind.
Standard Foundry Co., Worcester, Mass.
The Stearns-Roger Mig. Co., Denver. Colo.
Valley Iron Works, Inc., St. Paul, Minn.
Vulcan Foundry Co., Oakland, Calif.
Washington Iron Works, Seattle, Wash.
Dorr-Oliver-Long, Ltd., Orillia, Ontario
Hartley Foundry Div., Landan Concrete

Machinery Co., Ltd., Brantford, Ontario Otis Elevator Co., Ltd., Hamilton, Ontario



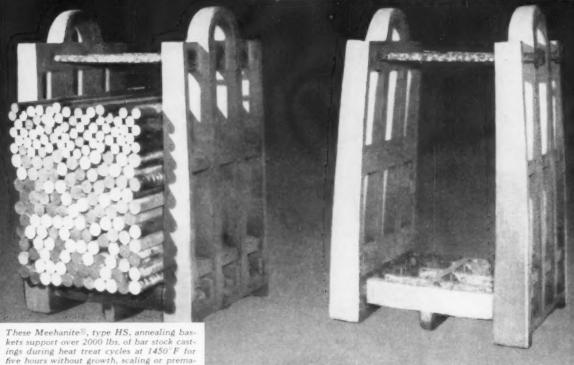
WRITE TODAY
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BEHAVIOR OF CASTINGS AT ELEVATED TEMPERATURES — BULLETIN TD-7

Write loday to Mechanite Metal Corporation, Dept. IA 7/4 North Avenue, New Rochelle, N. Y.

#### MEEHANITE'





## Heat resisting Meehanite castings provide dependable service at high temperatures

Metal parts subjected to high temperatures undergo dimensional and structural changes which can lead to premature cracking or surface disintegration and scaling. These serious causes of failure can be avoided by selecting materials capable of withstanding the specific heat stresses involved.

ture cracking. They are made by Centrifugally Cast Products Div., the Shenango Furnace

Co., Dover, Ohio.

The stabilized structure of Meehanite metal is particularly suitable for engineering applications where components must function dependably under steady or cyclic high temperature conditions.

This dependability of Meehanite® at

elevated temperatures has led to its acceptance as a standard material for annealing pots, dies and fixtures, ingot molds, stoker parts, steel mill furnaces, smelting, cement and roasting furnaces, tube mill furnace rolls, incinerator liners, etc.

There are ten types of heat-resisting Meehanite metals available from which selection can be made according to conditions of service at high temperatures. For more detailed information write for a copy of our new, 4 page bulletin TD-7—"Behavior of Castings At Elevated Temperatures"—or call the Meehanite foundry nearest you.





Test casting A, made from alloy gray iron was heat-treated for 300 hours at 1700°F in an oxidizing atmosphere. Severe growth and scaling is evident. Casting B, made from SC Meehantie® was given the same heat test. No growth or scaling occurred.

MEEHANITE BRIDGES THE GAP BETWEEN CAST IRON AND STEEL®

## MEEHANITE METAL

MEEHANITE METAL CORPORATION, NEW ROCHELLE NEW YORK



## METAL-MESH BELTS CUT OPERATING COSTS IN CONTINUOUS HEAT TREATING

Moving through a fiery 2050° F. temperature to fuse metal powders, Cambridge Woven Wire Belts easily resist heat and flame to give long service life, less maintenance, continuous, uniform production. Belt-to-belt flow of products through various heat treating operations eliminates costly manual handling, batch processing for faster, more economical production.

In annealing, quenching and washing operations, Cambridge belts help increase product uniformity and maintain capacity production. Here's why:

**OPEN MESH ALLOWS FREE CIRCULATION OF HOT GASES, LIQUIDS** through belt and around product for faster, more uniform processing; quench and wash solutions drain freely, thoroughly.

ALL-METAL CONSTRUCTION IS HEATPROOF, ACIDPROOF—takes up to 2100° F. temperatures; resists corrosive attack; has no seams, lacers or fasteners to break.

SPECIAL SURFACE ATTACHMENTS AVAILABLE—raised edges or cross flights to hold product on belt during movement.

Maryland

Talk to your Cambridge FIELD ENGINEER soon—he'll explain the many advantages of continuous heat treating on Cambridge belts. And, he'll recommend the belt size, mesh or weave—in the metal or alloy—best suited to your operations. You'll find his name in the classified phone book under the heading "BELTING, MECHANICAL". Or, write for FREE 130-PAGE REFERENCE MANUAL giving mesh specifications, design information and metallurgical data.



OFFICES IN PRINCIPAL INDUSTRIAL CITIES



#### MATERIALS ROUNDUP

range of temperatures from very low to that close to boiling water. In addition, the valve is subjected to gas pressures of 150 psi and considerable mechanical shock.

Overcomes Conditions—To overcome these conditions, and to achieve a good appearance, company engineers decided to design the valve body as a stainless casting. Interstate Engineering Corp., El Segundo, Calif., produced the new valve to incorporate a centrifugally cast one-piece valve body. As a result, not only were necessary mechanical properties and appearance achieved, but the job-shop reports an overall saving in time and material amounting to 30 pct, of previous costs.

In selecting a suitable cast alloy, the designers had available to them about 20 Alloy Casting Institute designated types in the corrosion resistant category. Type CF-8 (corresponding to wrought type 304)—with 19 pet chromium, 9 pet nickel,



These six missile valve bodies are cast at one time.

and a maximum of 0.08 pct carbon—was chosen. This alloy, in addition to providing resistance to corrosion by oxidizing media, has exceptionally good shock resistance (impact strength) at sub-zero temperatures.

Eliminates Gas Leakage — The

valve bodies were made by a modified centrifugal casting technique. This permitted the casting of six 180-lb valve bodies at one time, thus decreasing the production cost per cast unit. Because of the one-piece cast design, dangers of gas leakage are practically eliminated.

Before installation, the valve was tested in a wide range of temperatures and mechanical conditions. In



Captive tests of missile systems are carried out at this tower.

its test program, Convair-Astronautics subjected the valve to temperatures ranging from —65°F up to nearly 500°F. It was also tested for mechanical strength at 2000 vibrations per second and at a stress equal to 15 times the pull of gravity. Company engineers report that the valve performed satisfactorily under these extreme conditions.

#### Improves Shell Resin

A recently developed powdered shell resin possesses good odor, mold release and rigidity properties, says its producer, Borden Chemical Co., Bainbridge, N. Y.

#### Lubes at 600°F

To meet high speed and high temperature lubrication requirements, Shell Oil Co., New York, has developed a new grease. It has an operating range from —45 to 600°F at speeds of 30,000 rpm.



### IMPORTANT MESSAGE FOR STEEL BUYERS!

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- Complete Handling & Cutting Facilities
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They find that by using our extensive local alloy steel stocks, they get cut-to-size steel

without scrap and wastage . . . without the considerable costs of maintenance and floor space, handling and cutting equipment, taxes and insurance.

> Moreover, their needs are filled FAST, due to the speedy local delivery service we offer.

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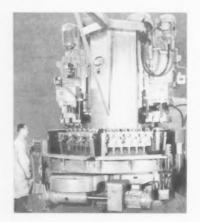
AGENTS:

Southern Engineering Company, Charlotte, N. C.; Sanderson-Newbould, Ltd., Montreal & Toronto



## **New Production Ideas**

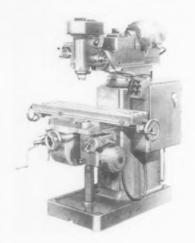
Equipment, Methods and Services



#### Transfer Machines Work 435 Parts Per Hour

Approximately 435 forged steel connecting rods per hour are turned out on two center column machines like this one. The 100-in, diam six-position center column machines work in series. They hold six parts in each position. In the first machine, the piston pin holes are drilled, core - drilled, chamfered from both sides and reamed to a final diameter of 1.0475 in. Processed parts are unloaded and unprocessed parts loaded at position

No. 1. In position No. 2 the piston pin holes are drilled halfway through and in position No. 3 drilled through. In position No. 4 the same holes are core-drilled for reaming. In position No. 5 both the top and the bottom sides of the holes are chamfered. In position No. 6 the piston pin holes are reamed to a 1.0475-in. diam, allowing sufficient stock for final boring. (National Automatic Tool Co., Inc.) For more data circle No. 40 on postcard, p. 117



#### Vertical Miller Takes 4-in. diam Cutters

This geared-in-ram vertical milling machine has a quill capacity to handle up to 4-in. diam cutters with ease. The quill is driven by a 3-hp motor mounted on the ram. An automatic collet closer with the miller holds cutters in position and eliminates tool slippage. It holds tools up to 1-in. diam shank size. The milling machine has 12 speeds ranging from 50 to 2500 rpm. It has six geared changes in its ram gear box, with a high and low range selection on the head. A neutral

position on the head allows for rotating the spindle by hand. The unit provides 6 in. quill travel by the hand feed lever, a hand wheel or power feed. It has three dial selected rates: 0.001, 0.0025 and 0.006 in. per revolution. Its ram is a dovetail type one with gear box and motor integrally mounted. This lets the spindle move to any position without any resetting for realignment. (Tree Tool & Die Works.)

For more data circle No. 41 on postcard, p. 117



#### Tractor Shovel Has 4-cu yd, 14,000-lb Capacity

Rated at 24-cu yd capacity, this large tractor shovel features fourwheel drive, a weight of 40,000 lb, and an operating capacity of 14,-000 lb. Driving on pneumatic tires. it handles just about any type bulk material. In thorough field tests. the unit operated over very severe terrain, loading materials directly into high sideboard railway cars. Powered by a six-cylinder, 425.6-cu in. displacement General Motors

engine, it has an Allison planetary fully automatic torquatic transmission. Its engine develops up to 240 hp at 2250 rpm. Timken Detroit planetary axles distribute stresses equally to all planetary gears for long, trouble-free gear life. Speeds range between 3.5 and 20 mph. Hydraulic power steering gives fingertip steering control. (Yale & Towne Mfg. Co.)

For more data circle No. 42 on postcard, p. 117

#### Milling Table

Especially designed for use on drill presses to perform milling operations, a new cross slide milling table is 18-in. long, 95s-in. wide. Longitudinal travel is 11 in. Cross feed is 6½-in. Large, easy-to-read dials are graduated in thousandths. Net weight of the table is 133 lb. (Chicago Tool & Engineering Co.) For more data circle No. 33 on posteard, p. 117

#### **Protective Coating**

Lining large areas for protection against corrosive elements is possible with a new material in continuous sheet form. Consisting of unplasticized polyvinyl chloride, the material may be chemically bonded to ferrous and nonferrous metals, concrete, etc. It resists a broad line of corrosive chemicals, ranging from concentrated oxidizing acids to highly concentrated alkalies, as well as a large number of corrosive organic chemicals. (Wagner Bros., Inc.)

#### **Diecasting Unit**

Hydraulically operated, a new diecasting machine has a capacity of 7 lbs shot in zinc. It has 150-ton locking pressure, uses 2½-in, tie bars. Equipped with 24 x 24-in, steel platens, the machine has an extra large capacity melting furnace and high cycling speed. It'll convert to aluminum with a cold chamber attachment. (ABC Die Casting Machine Co.)

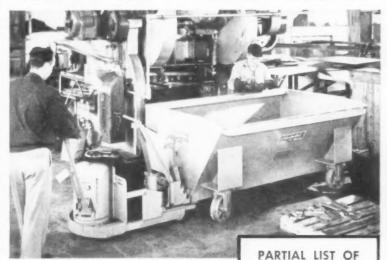
For more data circle No. 45 on postcard, p. 117

#### **Press Control**

A new electro-mechanical overload detector automatically adjusts for temperature or any other slow change of working conditions. It electronically trips the power clutch control which shuts down the machine when misfeed, buckling, end of material, jamming, pile-up, or mechanical change in the shut height of the die occurs. You can put it on your presses in less than an hour, (Wintriss, Inc.)

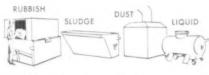
For more data circle No. 46 on postcard, p. 117

## Industrial Leaders "CONTAINERIZE" Waste As It Accumulates



## Dempster-Dumpster System Provides Temporary Storage at Points of Waste Accumulation

Enclosed temporary storage of waste is the key to plant cleanliness and low-cost disposal. Clean Dempster-Dumpster Containers, placed at major inside and outside waste accumulation points, perform this vital function. Costly rehandling is eliminated; one man and one truck-mounted Dempster-Dumpster dispose of all waste from your plant . . . picking up, hauling and dumping containers on a planned shuttle schedule. This low-investment System generally pays for itself in 18 months or less.



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Standard Oil Company

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U. S. Rubber Co.

U. S. Steel Westinghouse





#### **Torsion Tester Checks Dangerous Materials**

Explosives and other dangerous materials can be safely tested with this remote controlled torsion testing machine. Its loading and indicating units are completely separate: they may be located at practically any distance from each other. The only connection between the two cabinets is electrical wiring. With this machine, torque is applied and

indicated in both directions of rotation. In operation, it continuously applies a predetermined twist and reverses itself automatically, using only one set of grips. A light on the control panel shows in which direction the load is being applied. (Tinius Olsen Testing Machine Co.)



#### Custom Tailored Welder Ups Grating Output

Built by its user to the company's own specifications is this modern automatic welding machine. It automatically welds quality metal grating. Because the features the firm wanted weren't incorporated into any available machine, company engineers designed its own. Basically, they started with a Verson gib guided 125-ton heavy-duty special circuit hydraulically operated press, to insure uniform heating and forging. This machine has four National resistance welding transformers with it. These total 1200-

kva. Eight point tap switch heat regulators control welding heat. To this, the engineers added controls and a specially designed indexing unit hydraulically operated to give a positive spacing of cross bars. This combination gives a machine with a typical 8-hour shift production of about 3500 sq ft of grating. It lets the firm weld a variety of quality metal grating in a substantially increased production capacity. (Klemp Metal Grating Corp.)





#### **Drum Sander Uses Ordinary Abrasive Strips**

Rather than endless belts, a new drum sanding unit uses ordinary strips of coated abrasive. Handy for buffing, polishing or metal removing operations, the drum sander works with coated abrasive in grits from coarse to fine. It offers the inherent economy of using an abrasive piece torn off a normal shop roll. This strip can be easily, quickly wrapped around the drum sander, hooked over its pins, and locked solidly into place. A cone-shaped

lock washer keeps the sander halves together during the operation. What's more, its maker says the setup is absolutely safe up to 6000-rpm speeds. There's no "bump" or irregular grinding action due to the split in the drum either; the tool is precision machined and well-balanced to run true at normal operating speeds. It's made of aluminum alloy (American Diamond Saw Sales.)

For more data circle No. 49 on postcard, p. 117



#### **Boring Machines Handle Many Precision Jobs**

Highly accurate boring is performed by this fine boring machine. Adjusting of the boring tool to any desired diameter is done via a dialindicator (reading in thousandths of an inch) and a master. Made in Sweden, the machine is available with automatic rapid forward and slow reverse feed for rough and fine cuts. It comes with variable spindle speed from 100 to 5000 rpm. The tine borer will work holes from 0.600 to 1.800 in. Table travel is 8.300 in. (Homestrand, Inc.)

For more data circle No. 50 on postcard, p. 117

#### Press Brakes

Of heavy-section steel plate construction, a new line of hydraulic press brakes boast extra rigidity. accuracy under all load conditions. A hard ram insert and sectional ram insert and sectional ram clamp assure efficient use of all lengths of dies from very short to the full length of the ram. Ram movement is guided by score-proof. laminated non-metallic liners. Two saddle blocks support the frame, to which the bed is bolted. Right now, the press brakes come in six series. 300 to 2000-ton capacities. (Dreis & Krump Mfg. Co.)

For more data circle No. 51 on postcard, p. 117

#### **Ball Bearings**

Ball bearings in a new series accommodate commercially ground inch shafting; they may be used in standard pillow blocks. Prelubricated, the bearings have a seal that keeps out dirt, moisture. (Marlin-Rockwell Corp.)

For more data circle No. 52 on postcard, p. 117

#### Thermocouples

Leakproof, high-pressure thermocouples operate in pressure systems to 80,000 psi in temperatures to 1000°F. Used to measure temperature differentials, the thermocouples fit reaction vessels, etc., which have ½4, ¾s or 9/16-in, diam openings. (American Instrument Co.)

For more data circle No. 53 on postcard, p. 117

#### Safe Stud Driver

Safety features abound on a new stud driving tool. According to its maker, the driver itself will stop any alloy steel fastener in its tracks should it be fired mistakenly into a soft or insubstantial construction material. Powered by a 22-cal blank cartridge, the tool combines power,

# FURNACES for Bright Annealing Stainless

Tubing, Strip, Wire, Stampings and Other Stainless Steel Products



An EF multiple tube type furnace bright annealing stainless steel wire, continuously. One of an installation of five in one plant.

Stainless steel strip in various widths is bright annealed continuously in this EF gas fired special atmosphere installation.

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Stainless Steel Tubing in various diameters and lengths is bright annealed continuously in this EF gas fired furnace.



Stainless Steel Stampings, flatware, drawn and other products; large, small and in various shapes are bright annealed in EF furnaces.

1

#### BULLETIN No. 461

shows typical installations of EF Gasfired, Oil-fired and Electric Furnaces. Send for a copy today!

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Canadian Associates . CANEFCO, LIMITED . Terento I, Canada

#### NEW EQUIPMENT

precision and speed, along with safety. Its maker states that the tool has a self-arresting device that halts both stud and driving piston should it be fired into the wrong material. (Remington Arms Co., Inc.)

For more data circle No. 54 on postcard, p. 117

#### **Lapping Machines**

Specifically designed for maintenance lapping, this machine will reface workpieces to a precision flatness of 0.0000116 in., with microfinishes of 2 to 3 rms. The unit retains basic design features of larger machines used in production and custom lapping. It doesn't have to



be stopped for redressing or truing the lap plate. Flatness of the lap plate is continuously maintained by the patented action of the conditioning rings. The machine has two conditioning rings mounted on the 10in. diam lap plate which also serve as work holders to accommodate up to 334-in. diam parts. (Crane Packing Co.)

For more data circle No. 55 on postcard, p. 117

#### Marking Machine

High-speed automatic roll marking is performed by a new machine. It roll marks gradually under very low pressure, which recommends it for handling thin-wall materials. Marking is done in multiple passes of a roll die. Yet the unit keeps a high production rate, thanks to an extremely high-speed motorized re-

ciprocating die slide. Both marking pressure and the number of roll marking passes are infinitely variable. (Noble & Westbrook Mfg. Co.)

For more data circle No. 56 on postcard, p. 117

#### Brightener Dispenser

One producer's liquid brighteners now come in a new automatic dispensing package. This gives users better control over brightener feeding and makes storage more convenient, more economical. The pack consists of a 1-gal, cube-shaped, disposable polyethylene container in a corrugated box. (Allied Research Products, Inc.)

For more data circle No. 57 on postcard, p. 117

#### Impact Wrench

With rated capacity for running and removing nuts or bolts up to <sup>3</sup>s in., a new electric impact wrench has a <sup>4</sup>2-in, square drive. It produces 2000 impacts per minute, developing 100 ft-lb torque. Under favorable conditions it'll run and remove up to <sup>5</sup>s-in, fasteners. (Millers Falls Co.)

For more data circle No. 58 on postcard, p. 117

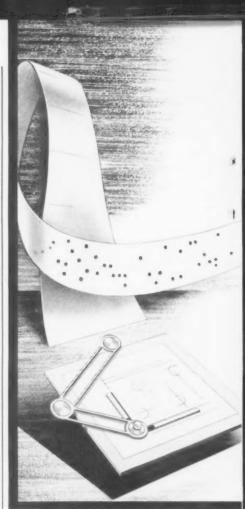
#### **Hoist Trolley**

One man can raise, lower or move up to 2-ton loads with a new powered hoist trolley. Powered by an axial-piston type air motor, the setup exerts 250-lb drawbar pull in a beam through a rugged springloaded neoprene drive wheel. It pulls a 2-ton load at 70 fpm. Speed can be varied from a slow creep to a full 150 fpm speed, depending on the load and situation. (Gardner-Denver Co.)

For more data circle No. 59 on postcard, p. 117

#### Tape-run Lathes

Available as optional equipment on one maker's automatic turret lathes is a tape control setup. And it can be added to machine tools already at work in your own shop. The tape control runs all machine motions via data on an easily pre-

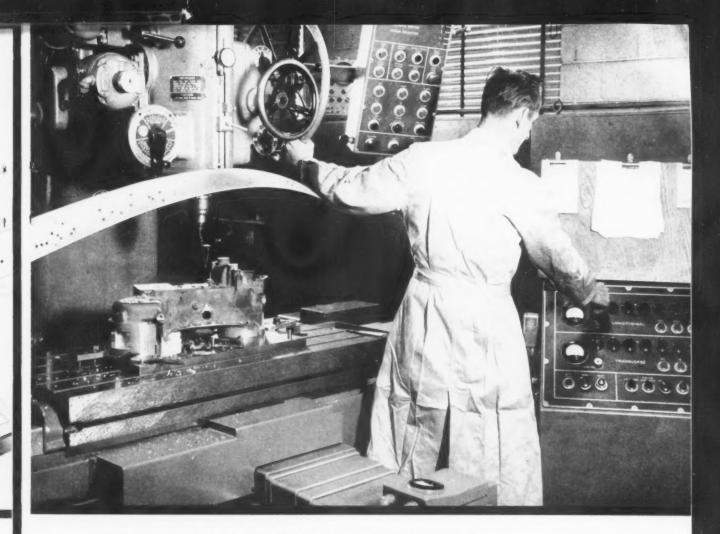




### OTHER P&W NUMERICALLY CONTROLLED MACHINE TOOLS

. . . include the No. 2E Vertical Precision Hole Grinder and the 42" Precision Rotary Table.





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... WITH P&W NUMERICAL CONTROL! Precision work put on predictable production schedules, completed in as little as 1 10 the time required by previous methods. Costly human errors are eliminated. Positioning accurate to "tenths" absolutely guaranteed. These benefits are reported by Dexter Tool Company of Hazel Park, Michigan, since installing a Pratt & Whitney Numerically Controlled Jig Borer. Dexter produces precision aircraft and automotive components. Work involves 6 to 50 identically machined parts, and it's important to guarantee precision, accurately estimate production time and deliver on schedule. Positioning itself automatically by punched tape,

the Numerically Controlled Jig Borer handles "tenths" limits as fast and surely as ordinary work. A Dexter spokesman states, "We think the P&W 2E Numerical is the greatest single improvement in machine tooling. It's the ultimate."

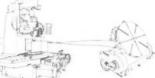
Today, "tenths" limits are common, yet profitable operation demands that you produce faster than ever before. Pratt & Whitney Machine Tools with Numerical Control can provide the right answer for you!

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. ROTARY TABLES

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#### NEW EQUIPMENT

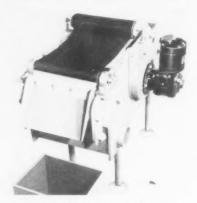
pared punched tape. It can cut set-up and machining time on many jobs. (Potter & Johnson Co.) For more data circle No. 60 on postcard. p. 117

#### Creep Rupture Tester

A new creep rupture tester is especially made for light-load or small-specimen testing. It features a completely open front, permitting easy access to the furnace and the control panel. The unit is 20-in. deep, 30-in. wide, 78-in. high. Lever ratio is 16 to 1. (Arcweld Mfg. Co.) For more data circle No. 61 on postcard, p. 117

#### **Magnetic Separators**

Two models of high efficiency magnetic coolant and cutting oil separators deliver clean coolant, more dry swarf in grinding, honing, lapping, thread grinding and other operations. Effective cleaning of coolants and cutting oils extends



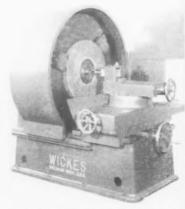
their life, of course. This reduces operating costs. Re-use of coolants cures waste disposal worries. The separator units remove both metallic and nonmetallic solids through a combination of magnetic and mechanical separation. (Infileo Inc.)

For more data circle No. 62 on postcard, p. 117

#### Wheel Resizing Unit

This 42-in, grinding-wheel salvaging machine resizes and rebores worn grinding wheels in 15 to 20 minutes for other productive plant uses. Silicon carbide, diamond and

all other types of worn grinding wheels can be resized right in the users own plant. It can also size new grinding wheels to meet specific production requirements. Grinding wheels from 8 to 42 in. diam, up to 14-in. thick, can be handled. It uses standard conical



type grinding wheel dressers, the cutting action being confined to crushing the wheel bonding. (Wickes Corp.)

For more data circle No. 63 on postcard, p. 117

#### NEW BOOKS

"Gray Iron Castings Handbook" edited by C. F. Walton is packed with information on the subject. Practical reading for designers, purchasers or users, the reference work gives attention to recent developments in ductile (nodular), white and high alloy irons. Also devoted in part to regular gray iron, the publication isn't just for reading, but for using, 411 illustrations, 64 tables, 620 pp. \$10 per copy, Gray Iron Founders Society, Dept. P. National City-East Sixth Bldg., Cleveland 14, Ohio.

"Vocational & Professional Monographs — The Iron & Steel Industry," by Tom Campbell, Editor-in-chief. The IRON AGE, offers high school, college students or apprentices a convincing case that the metalworking field is the place to work. Written in plain, down-to-earth, easy to read language, it offers a history of the trade and tells what opportunities and

#### Let me\* show you



Bob Marr, P&J Representative Houston, Texas. Telephone: ME Irose 7-3964

how changing to
a P&J Automatic
helped Reed
Roller Bit Company

JOB FACTS:

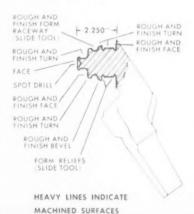
PART: Lug for Oil Well Bit

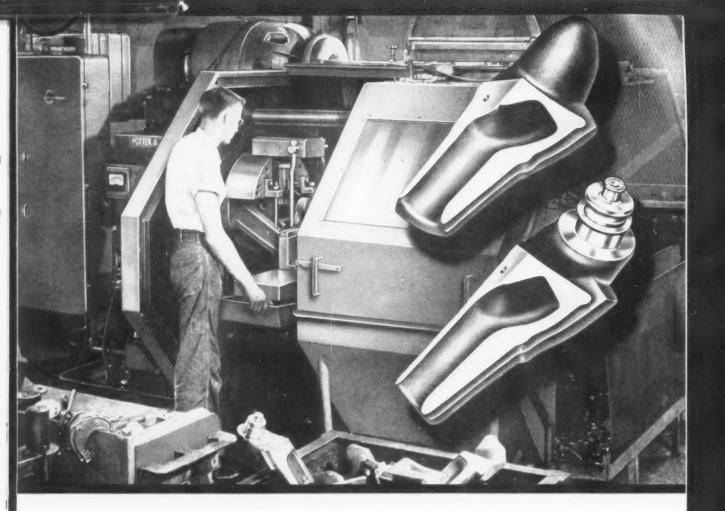
MATERIAL AISI 8720 Steel Forging

REQUIRED: Several complex, precision cuts, with certain diameters held to .004" of nominal size

THE MACHINE: A 6DRE-40 Automatic Turret Lathe

THE RESULTS: Part completed in single, fully automatic cycle. Machine cycle time just 4.5 minutes!





## ELIMINATE 4 MACHINES and REDUCE OPERATING COSTS!

One of our Potter & Johnston 6DRE-40 Automatic Turret Lathes was recently installed in Houston, Texas at the plant of the Reed Roller Bit Company . . . a leading producer of oil well drilling tools. Handling a series of complex cuts on a tough steel forging, this new P&J machine and one operator have replaced 5 semi-automatic machines and released four skilled operators for other important work. Machine cycle time has been cut to 4.5 minutes. These reductions have produced important money savings plus a big and badly needed increase in output. And in addition to meeting all these basic requirements, the 6DRE-40 has also proved its toughness. Despite heavy metal re-

moval on an exceptionally tough alloy, this P&J Automatic is operated successfully on a 3-shift basis with time out only for routine cleaning and maintenance.

If - like the Reed Roller Bit Company - you have tough-to-machine jobs you'd like to turn out more economically, a switch from hand or semi-automatic machines to P&J Automatics can do the trick for you too! Act today. Ask the P&J Representative in your area to analyze your requirements and recommend a production plan to meet your specific needs. If you prefer, write direct to Potter & Johnston Company, Pawtucket, Rhode Island.











AUTOMATIC TURRET LATHES . . . GEAR CUTTERS . . . PACKAGING MACHINES



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#### NEW BOOKS

adventure is available in it. "There are openings for those who finish high school; for those who have some college; for those who complete college and for those taking advanced work leading to a master's or a doctor's degree," says Campbell. In short, here's a booklet for some youngster you know, 40 pp. Bellman Publishing Co., Cambridge 38, Mass.

"Metal Grating Handbook" briefly outlines key design data for architects, engineers and builders. Prepared by a group of firms making metal gratings and treads, it passes on test information, standard design procedures, specifications, and a code of standard practice generally accepted by manufacturers. 28 pp. \$1 per copy. Metal Grating Institute, One Gateway Center, Pittsburgh 22, Pa.

"Metal & Industrial Mines in Canada" lists data on all major Canadian metal and mineral mines. 37 pp. 25¢ per copy. Dept. of Mines & Technical Surveys, Ottawa, Canada.

"The Rolling of Strip, Sheet & Plate" is strictly for those familiar with mill production. From the rolling mill's humble origin, it traces the process to today's scientifically modern plant. It discusses principles for increasing efficiency, decreasing mechanical breakdown, and making a better product. All mill types are covered. 404 pp. \$12.75 per copy. The Macmillan Co., 60 Fifth Ave., New York 11.

"The Iron & Steel Industry of Europe" contains economics texts and numerous statistical charts on everything from raw materials to finished products. Its tables are impressive. 96 pp. \$2 per copy. Organization for European Economic Co-Operation, Suite 1223, 1346 Connecticut Ave., N. W., Washington 6, D. C.

#### The Iron Age Summary

## February May Set Year's Low

Mills have just about written off February as poorest month of 1958.

An upturn is looked for in March. Predicted auto strike poses big question mark.

• Steel output may hit its low point for the year this month. The mills have just about written off February as perhaps their poorest month of 1958. At the same time, there are signs that production will turn upward in March.

The mills feel inventories may soon begin to work for them—instead of against them. They say any increase in auto sales has got to bring an increase in automotive orders for steel. Over recent months they have been getting double doses of cutbacks—customer production slashes plus inventory cuts. Now they are hopeful that the cycle will reverse itself—production increases plus inventory build-ups.

Auto Strike Question—If March proves to be the critical month as steel men hope, the mild improvement could continue through April and May. Beyond that point the predicted auto strike poses a big question mark. A two-month strike would bring the auto companies into the new model slowdown period starting in August. That would make September the month for a big pickup. Drastic model changes for General Motors and early model introductions as a spur to sales already are being predicted.

While some steel men say their order volume has picked up a little recently, most feel there won't be a significant upturn before start of the fourth quarter. Meanwhile, steel users are continuing to work with extremely low inventories and are pushing the mills for quick delivery. One steel producer reports receiving an order from a customer with instructions to deliver by a certain date or cancel it out.

Scrap Prices Up—Iron and steel scrap prices continued to move upward this week. Bids for industrial scrap tonnages are several dollars higher. And recent sales to steel mills have been at higher prices. The downturn in prices that started early last year has definitely reversed itself. While no one is talking about a sharp upturn, the steady improvement in recent weeks is taken as an indication of better things to come.

Steel warehouse sales are showing some improvement even though business is off from a year ago. Some warehouses are limiting their inventory cutbacks to plate, structural, and bars and angles. Sheet demand is showing surprising strength. A few distributors say it may be necessary to step up their sheet orders from the mills before the end of February. Talk of a gradual improvement into March is growing, but no one will forecast beyond that point.

#### Steel Output, Operating Rates

Net tons, 000 omitted   1,454   1,459   1,498   2,496	Production	This Week	Last Week	Month Ago	Year Ago	
Part	(Net tons, 000 omitted)	1,454	1,459	1,498	2,496	
Operating Rates           Chicago         58.0         59.0*         60.0         94.0           Pittsburgh         57.5         58.0         52.5         99.0           Philadelphia         62.0         63.0         71.0         105.0           Valley         44.0         45.0*         48.0         96.0           West         66.0         65.5*         71.0         100.0           Buffalo         51.0         54.0         51.0         105.0           Cleveland         39.0         34.0*         52.0         99.0           Detroit         53.0         51.0*         63.0         100.0           S. Ohio River         55.5         59.0*         61.0         84.0           South         52.5         52.0         62.5         95.0           Upper Ohio R.         58.0         58.5*         58.0         104.0           St. Louis         76.0         78.0*         79.0         99.5           Northeast         31.0         31.0         31.0         31.0		22.5				
Chicago 58.0 59.0* 60.0 94.0 Pittsburgh 57.5 58.0 52.5 99.0 Philadelphia 62.0 63.0 71.0 105.0 Valley 44.0 45.0* 48.0 96.0 West 66.0 65.5* 71.0 100.0 Buffalo 51.0 54.0 51.0 105.0 Cleveland 39.0 34.0* 52.0 99.0 Detroit 53.0 51.0* 63.0 100.0 S. Ohio River 55.5 59.0* 61.0 84.0 South 52.5 52.0 62.5 95.0 Upper Ohio R. 58.0 58.5* 58.0 104.0 St. Louis 76.0 78.0* 79.0 99.5 Northeast 31.0 31.0 31.0 31.0	(1947-1949=100)	90.5	90.8	93.2	155.4	
Pittsburgh S7.5 58.0 52.5 99.0 Philadelphia 62.0 63.0 71.0 105.0 Valley 44.0 45.0* 48.0 96.0 West 66.0 65.5* 71.0 100.0 Buffalo 51.0 54.0 51.0 105.0 Cleveland 39.0 34.0* 52.0 99.0 Detroit 53.0 51.0* 63.0 100.0 S. Ohio River 55.5 59.0* 61.0 84.0 South 52.5 52.0 62.5 95.0 Upper Ohio R. 58.0 58.5* 58.0 104.0 St. Louis 76.0 78.0* 79.0 99.5 Northeast 31.0 31.0 31.0 31.0	<b>Operating Rates</b>					
Aggregate 54.1 58.5 97.5	Pittsburgh Philadelphia Valley West Buffalo Cleveland Detroit S. Ohio River South Upper Ohio R. St. Louis	57.5 62.0 44.0 66.0 51.0 39.0 53.0 55.5 52.5 58.0 76.0	58.0 63.0 45.0* 65.5* 54.0 34.0* 51.0* 59.0* 52.0 58.5* 78.0*	52.5 71.0 48.0 71.0 51.0 52.0 63.0 61.0 62.5 58.0 79.0	99.0 105.0 96.0 100.0 105.0 99.0 100.0 84.0 95.0 104.0 99.5	
	Aggregate		54.1	58.5	97.5	

\*Revised

#### Prices At a Glance

(cents per lb unless otherwise	noted)			
	This	Week	Month	Year
	Week	Ago	Ago	Ago
Composite price				
Finished Steel, base	5.967	5.967	5,967	5.622
Pig Iron (Gross ton)	\$66.42	\$66.42	\$66.42	\$62.90
Scrap, No. 1 hvy				
(Gross ton)	\$36.67	\$35.00	\$33.00	\$53.83
No. 2 bundles	\$28.17	\$27.17	\$24.67	\$44.67
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	27.10
Copper, electrolytic	27.00	27.00	27.00	34.00
Lead, St. Louis	12.80	12.80	12.80	15.80
Magnesium ingot	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin Straits, N. Y.	93.00	94.00	93.00	102.50
Zinc, E. St. Louis	10.00	10.00	10.00	13.50

## Motor Buyers Get Fast Delivery

With sales lagging, makers of fractional, integral, and large motors can promise rapid shipment.

They also stress competitive prices and improved designs in race for business.

 The buyer's market is back for electric motors.

Buyers of integral horsepower motors began assuming control early last year. The purchaser became top man in the large motor field late in 1957. Buyers of fractional horsepower motors have held the upper hand for years.

The current market reflects a general sales slide for motors. New orders for ac motors (1-200 hp) dropped by \$10 million from the third quarter in 1956 to the third

quarter in 1957. Billings fell by \$12 million in the same period.

Hunt for Buyers — With sales skidding, motor makers have gone after customers with offers of rapid delivery, competitive prices and improved design. Builders are carrying large stocks of standard models. They are finding ways to push special motors through production in less time.

Despite sales and production problems, motor men speak bravely of the long-term future and hopefully of the immediate outlook,

", . . We expect with the coming of spring that conditions will take a turn for the better with gradually increasing employment," says Harold MacKinnon, general manager, component products division, General Electric, Fort Wayne, Ind.

"Total industry sales of motors (1 hp and up) will increase by \$200 million or 30 pct by 1961," says General Electric Vice President J. M. Crawford.

Outlook for Fractionals — Lagging appliance sales have backed up on makers of fractional horsepower motors. They are being asked to supply motors in less time than they can make them. Most standard types are being shipped in 3 to 6 weeks; special models are available in about eight weeks.

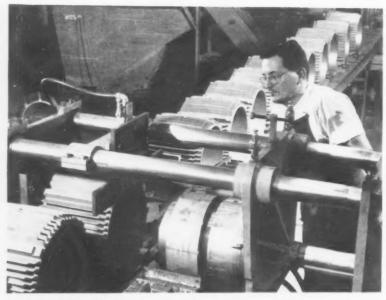
Design trends in the fractional range include; reduced motor sizes; a continued swing away from demotors.

Integral Sales Slow—Sales of integral horsepower motors began dropping sharply in the fourth quarter of 1957. They continue to lag and a pickup is not expected before the second quarter of this year.

Motor makers are offering offthe-shelf delivery on standard ac models. Deliveries of special ac motors range from two to eight weeks. Deliveries of dc motors run from five to twelve weeks.

More Interest in Rectifiers—Sales of large motors (over 500 hp) dropped in the final three months of 1957 as big aluminum and steel expansion programs began running out. Today, the backlogs of builders are down. They can find holes in their schedules for most motors.

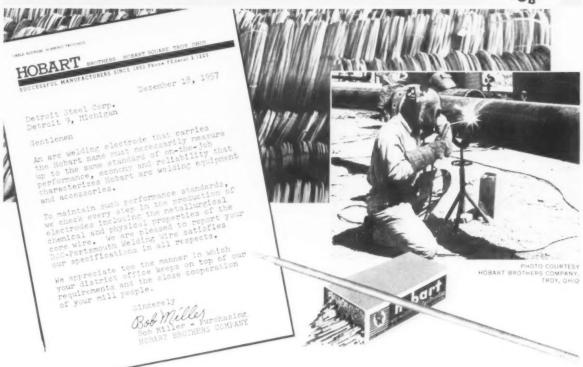
Trends include higher speed drives, more compact power packages, and greater interest in rectifiers for steel mill motors. One big reversing mill is due to use a rectifier instead of a motor generator. Strip mills have used the rectifiers but not reversing stands. Advantage is less weight and less foundation cost.



**MOTOR ASSEMBLY:** Stator laminations for integral horsepower motors are seated in stator frame with the aid of a special hydraulic press at the Bullalo plant of the Westinghouse Electric Corp.







### DSC Portsmouth Welding Wire Helps Maintain Hobart Electrode Quality

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#### "SPECIAL" IS THE WORD FOR WELDING WIRE

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## Freight Hike Raises Steelmaking Costs

Higher shipping charges, due on Feb. 15, will add further to steel costs.

Among products affected are ore, coal, coke, limestone, pig iron, and scrap.

 Steelmaking costs are due for another boost.

New freight rates, affecting such raw materials as ore, coal, coke, limestone, pig iron, and scrap, are slated to take effect February 15. Their earlier effective date of Feb. 1 was postponed to give shippers a chance to protest their imposition. But there's little doubt the hikes—which could raise ore costs by 50 cents a ton—will be granted.

Their impact on steel's cost structure makes even more likely an increase in the price of finished steel products by mid-year. They follow the 5e-an-hour cost-of-living pay increase which steelworkers obtained under their contract on Jan. 1. And they precede an automatic wage hike of 7e an hour and another possible cost-of-living raise on July 1.

What Freight Boosts Mean—The freight increases will probably be added to steel scrap prices. Some mills have already figured an extra 50e per ton to their scrap costs.

One steel traffic manager complains, "The increases are just too much to swallow, We'll have to go to barges or something."

Here's how freight costs will rise under the new rates:

Iron ore from the ore fields to Upper Lakes ports—5 pct or 25e a ton. Ore from the Lower Lakes or seaboard to furnaces—10 pct or 25e a ton. Coke—15e a ton. Coal—10e a ton on most hauls. Limestone and raw dolomite—10e a ton.

Pig iron and scrap will go up 2e per hundredweight or 40e a gross or net ton. Billets, blooms, wire rods, slabs and ingot molds will be advanced a maximum of 5e per hundred-weight or 40e a gross or net ton. Firebrick will rise 1e per hundred-weight,

Sheet and Strip-Spot ordering for quick delivery remains the dominant market trend. Any talk among producers about a pickup in March seems to be only speculation. Automotive ordering for February is below January levels and the outlook for March is uncertain. Mills are still setting back or canceling tonnages for automotive and other buyers. Some appliance customers in the Midwest are busy, others are not. Among all buyers requests for emergency shipments of sheet in a week indicate inventories are bone dry.

Plate and Structurals — Market continues to weaken. Many customers are making heavy reductions in plate inventories for the

#### PURCHASING AGENTS CHECKLIST

Aluminum extrusion makers are caught in price squeeze. P. 58

Expect business upturn in early September, expert says. P. 61

Purchasers believe spring buying will hold at about current levels.

P. 64

first quarter. Orders come in with requests for rapid delivery. Among those cutting back plate stocks in the **Midwest** are linepipe customers, tank and vessel fabricators, railroad carbuilders, and shipyards. One buyer there has dropped second quarter needs by 40 pct, plans another 20 pct cut if sales hopes don't materialize.

Bar — Construction activity is adding some needed spark to this market. An early start to building programs in the south and midsouthern areas is increasing hopes of a good year for bar products. Heavy sales of rods in the Midwest are expected in the spring with users out to beat any steel prices increases at mid-year.

Pipe and Tubing—Buyers of oil country seamless pipe are ordering only on a spot basis. As a result the product is expected to continue off until at least April. Mills are maintaining stocks to pick up whatever business is available.

Wire Products—Some welcome activity in the market is encouraging producers a trifle. Manufacturers wire is moving fairly well and merchant wire orders are picking up a little. Distributors are stocking up on merchant products for the spring, and farm buying is gaining some strength. Net result is talk among wire producers of a gradual, long-range gain for their product through the first half of the year.

Warehouses — Some improvement in sheet sales has Midwestern distributors foreseeing a gradual market improvement in the next two months. Some have tailored inventory cuts so that they now only include plate, structurals, and small quantities of bar and angle. Warehouses in the Cincinnati area have higher inventories than normal. They are still working down stocks accumulated for a fourth quarter pickup that never materialized. Outof-the-area suppliers are reaching into the district to pick up business.

#### COMPARISON OF PRICES

Price advances over previous	week are	printed	in Heavy	Type:
declines appear in Italics.	Feb. 4	Jan. 28	Jan. 7	Feb. 5
	1958	1958	1958	1957
Flat-Rolled Steel: (per pound)		1000		
Hot-rolled sheets	4.925€	4.925€	4.925¢	4.675€
Cold-rolled sheets	6.05	6.05	6.05	5.75
Galvanized sheets (10 gm.)	6.60	6.60	6.60	6.30
Hot-rolled strip	4.925	4.925	4.925	4.675
Cold-rolled strip	7.17	7.17	7.17	6.870
Plate Plate	5.12	5.12	5.12	4.87
Plates, wrought iron Stainl's C-R strip (No. 302)	13.15 52.00	13.15 52.00	13.15	10.40
Statill's C-16 strip (189, 302)	52.00	52.00	02.00	50.00
Tin and Terneplate: (per base bo	ox)			
Timplate (1.50 lb.) cokes	\$10.30	\$10.30	\$10.30	\$9.95
Tin plates, electro (0.50 lb.)	9.00	9.00	9.00	8.65
Special coated mfg. ternes	9.55	9.55	9.55	9.20
Bars and Shapes: (per pound)				
Merchant bar	5.425€	5.425€	5.425€	5.075¢
Cold finished bars	7.30	7.30	7.30	6.85
Alloy bars	6.475	6,475	6.475	6.125
Structural shapes	5.275	5.275	5.275	5.00
Stainless bars (No. 302)	45.00	45.00	45.00	43.25
Wrought iron bars	14.45	14.45	14.45	11.50
Wire: (per pound)				
Bright wire	7.65€	7.656	7.65¢	7.20€
		,,,,,,		
Rails: (per 100 lb.)				2
Heavy rails	\$5.525	\$5.525	\$5.525	\$5.075
Light rails	6.50	6.50	6.50	6.00
Semifinished Steel: (per net ton				
Rerolling billets	\$77.50	\$77.50	\$77.50	\$74.00
Slabs, rerolling	77.50	77.50	77.50	74.00
Forging billets	96.00	96.00	96.00	91.50
Alloy blooms, billets, slabs	114.00	114.00	114.00	107.00
Wire Rods and Skelp: (per pour	(Type			
Wire rods	6.15€	6.15€	6.15¢	5.80¢
Skelp		4.875	4.875	4.225

Finished	Steel	Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

#### Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Phila-delphia, Buffalo, Valley and Birmingham.

001111711	(Effec	tive Feb.	1, 1958/
Feb. 195		Jan. 7 1958	Feb. 5 1957
Pig Iron: (per gross ton)		*****	000.00
Foundry, del'd Phila 870.5	1 \$70.51	\$70.51	\$66.88 63.00
Foundry, Valley	0 66.50	66.50 71.65	67.17
Foundry, Southern Cin'ti 71.6	5 71.65	62,50	59.00
Foundry, Birmingham 62.5		66.50	63.00
Foundry, Chicago 66.5		70.01	66,38
Basic, del'd Philadelphia 70.0		66.00	62.50
Basic, Valley furnace 66.0		66.50	63.00
Malleable, Chicago 66.5		66.50	63.00
Malleable, Valley 66.5	0 66.50	00.00	00,00
Ferromanganese, 74-76 pct Mn, cents per lb1	5 12.25	12.25	12.75
Pig Iron Composite: (per gross ton) Pig Iron	2 866.42	866.42	\$62.90
rag from the contract of the c			
Serap: (per gross ton)		400.00	854.50
No. 1 steel, Pittsburgh \$36.3		\$32.50	57.50
No. I steel, Phila, area 38.0		35.50	
No. 1 steel, Chicago 35.		30.50	49.50
No. 1 bundles, Detroit 28.1		21,50	42.50
Low phos., Youngstown 38.	35.50	34.50	54.50
No. 1 mach'y cast. Pittsburgh, 49.3	50 49.50	49.50	56.50
No. 1 much'y cast, Phila. 47.		50.50	60.50
No. I mach'y cast, Chicago 48.	50 47.50	44.50	51,50
Steel Scrap Composite:  per gross to	n i		
No. 1 hvy. melting scrap \$36.0	\$7 \$35,00	\$33.00	\$53.83
No. 2 bundles 28.	17 27.17	24.67	44.67
Coke, Connellsville:   per net ton at Furnace coke, prompt \$15.	24 215 38	815.38	\$15.38
Foundry coke, prompt \$17.50-\$19	\$17,50-819	817.50-819	\$17.50-19
Nonferrous Metals: (cents per pound	to large l	uvers)	
Copper, electrolytic, Conn 25.	00 25.00	27.00	34.00
Copper, Lake, Conn. 25.			34.00
Tin. Straits, N. Y 93.			102.50
Zinc, East St Louis 10.			13.50
Lend, St. Louis 12.			15.80
Aluminum, virgin inget 28.			
Nickel, electrolytic			74.00
			36.00
Magnesium, ingot 36. Antimony, Laredo, Tex. 33.			
† Tentative. 1 Average. * Revised.		00.00	
r remainive. I Average Revised.			

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Phila-delphia and Chicago.

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# TOOL



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# Industrial Lists Boost Prices

Competition for choice industrial lists gives market first real strength in weeks.

Trade hopes bidding for industrial scrap will be backed up by mill buying of dealer scrap.

 The first serious bidding in months for industrial lists sent prices up sharply in affected markets.

The renewed interest in the choice industrial tonnages brought about the most significant advance in the market since it started edging itself upward from the low ebb in mid-December.

Prices for openhearth grades rose \$3 in Pittsburgh, \$2 in Chicago, \$4 in Detroit, and even higher in Cleveland in the wake of automotive lists.

In spite of the sudden strength, most of the trade tempered its optimism with caution. Broker buying of industrial scrap was not immediately backed up by mill purchases of dealer scrap. Until it is, the dealer market will remain uneasy.

Dealer scrap still is not moving to mills in significant tonnages. Orders for the most part are small and are not from major mills. But dealers are short on inventory and are not eager to sell at quoted prices.

Another strengthening factor is a mild increase in export in the East and anticipated export demand on the West Coast.

As a result of higher prices in most markets. The IRON AGE Composite Prices rose significantly. No. 1 heavy melting stands at \$36.67, compared with \$35 a week ago.

Pittsburgh - Price No. 1 heavy

melting jumped \$3 here on the basis of strong bidding for industrial scrap and higher prices offered by yards for unprepared scrap. New price is \$36 to \$37. Prices of factory bundles, low phos, No. 1 railroad heavy melting are also up. Turnings are up \$1. Cast grades are holding firm. Mill purchases of dealer grades are still very light in this district. But mills in nearby districts are becoming more active.

Chicago — Mills failed to purchase heavy tonnages, but prices continue their advance on scattered purchases. Broker buying continues to move upward. Factory bundle bidding by brokers was particularly strong. Dealers complain of low stocks and show very little willingness to sell even in the light of new advances.

Philadelphia — Export continued to add strength to this market. Part of an overseas shipment was diverted to cover a domestic mill order. Low phos and electric furnace grades moved up \$1 to maintain the differential with openhearth scrap.

New York—Prices of steelmaking grades are rising in this area. Most sales are still for export but it is agreed that higher demand in other areas is a prime cause for local price increases. Prices vary somewhat with quality as brokers make an effort to draw out high quality material.

**Detroit** — Industrial scrap prices rose sharply as several local brokers who had been out of the market for the past two months ran headlong into competition from out of town.

No. 1 industrial bundles commanded \$35 under the combined influence of strong competition and reduced offerings. However, there is no evidence yet that the high prices are being supported by mill buying.

Cleveland — The Valley market caught fire last week as mills bought top dealer and industrial grades at prices from \$36 to \$38.50. Some electric furnace grades went for \$36 earlier in the week and some low phos plate went for \$38.

St. Louis—Several railroad lists brought higher prices aided by strength in other markets. Blast furnace grades also went higher on outside buying. Rail and track accessories continue to advance since there is an insufficient supply to meet even the small demand.

Birmingham — Steel production cutbacks continue to be reflected in the slow movement of scrap in this district. Openhearth and some electric furnace consumers are out of the market, while cast buyers are making only occasional purchases to maintain level inventories. The export market appears stronger,

Cincinnati — Prices went up \$1 for primary steelmaking grades as one mill announced its monthly buying program. A slow, steady increase is expected as dealers continue to hold out for price.

Buffalo — Dealers are optimistic that higher prices in other areas will be reflected here when a sale is made. The market has been inactive, with prices holding at the former level pending any new sales.

**Boston**—For the second straight week prices edged up slightly. However, there is no increase in business with demand still very low.

West Coast—Los Angeles prices are up \$2 on most grades. Mills could not meet their needs at lower levels. And there is some buying ahead in the face of an expected step-up in export activity. San Francisco and Seattle markets remain quiet.

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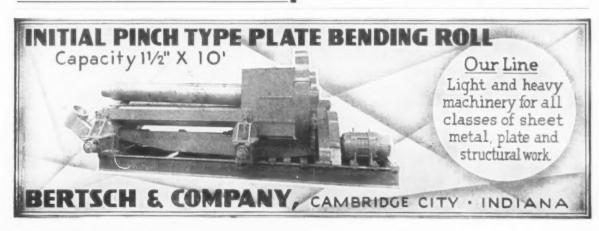
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Wm. H. Ottemiller Co. YORK, PENNA.



#### Pittsburgh

No. 1 hvy. melting .	SOR BUT	1 837.00
No. 2 hvy: melting	3.4.00 g	
No. 1 dealer bundles		
No. 1 factory bundles	38,00 t	
No. 2 laindles	38.88 t	
No. 1 August 1		
No. 1 busheling	36,00 t	
Machine shop turn	17,000	0. 18.00
Mixed bor, and ms. turn	17,000	0.18.00
Shoveling turnings	21.00 t	
Cast iron borings	21.00 t	
Larw phos. punch'gs plate		
Heavy turnings	35 00 1	
No. 1 DD have southing		
No. 1 RR hvy melting		
Serap rails, random leth		
Halls 2 ft and under	55.00 to	56.00
ER steel Wheels	48,000 1	429.000
RR spring steel	48 000 0	0 49.00
RR couplers and knuckles	18,00 1	
No. 1 machinery cast	49.00 to	
Christian and of	710 1111 4	
Cupola cast.	29,00 1	
Heavy brooks bla mass		T 6 . 1111

#### Chicago

No. 1 hyy, melting	\$35 HO to	336.00
ison a myy, mening	33.00 to	34.00
No. 1 dealer bundles	35,00 to	36,00
No. I factory bundles	40,000 to	31.00
No. 2 bundles	26,00 to	27.00
No. 1 busheling	34.00 to	
	20.00 to	21.00
Mixed bor, and turn	22,00 to	23.00
Shoveling turnings	22,00 po	27.00
Cast from borings	22 00 to	22,00
Low phos. forge crops	49,00 to	
Low phos. punch'gs plate.	45.00 to	44.00
Low plus, 3 ft and under	12.00 to	44 100
No. 1 RR hvy melting	29,00 to	40.00
Scrap rails, random igth	48,000 to	49,000
Rerolling rails	54.00 to	
Rails 2 ft and under	57,00 to:	58.00
Locomotive tires cut	49,68 to	
Cut bulsters & side frames	\$6,00 to	47,000
Angles and splice bars	\$1,00 to	52.00
RR steel car axles	53,00 to	54,000
RR couplers and knuckles.	47,00 to	48,00
No. 1 machinery cast.	45,000 to	49,000
t'upola cast	41.00 to	42.00
Heavy breakable cast.	39,00 to	40.00
Cast iron brake shoe	39.00 to	40,00
Cast from wheels	38.00 to	39,00
Malleable	52,00 to	
Stove plate	39,00 to	49,707
Steel car wheels	47,000 to	48.00

#### Philadelphia Area

No. 1 hvy. melting		
No. 2 hvy, melting	34,000 to	
No. 1 dealer bundles	37.50 to	38,58
No. 2 bundles	27.00 to	28.00
No. 1 busheling	37.50 to	38.50
Machine shop turn.	20,00 to	
Mixed bor, short turn	21.00 to	
Cast Iron borings	22.80 to	
Shoveling turnings		
Clare and throngs	22,00 to	
Clean cast chem. borings	30,00 to	
Low phos. 5 ft and under	40.00 to	41.00
Low phos. 2 ft and under	41.00 to	42.00
Low phos. punch'gs	41.00 to	42.00
Elec. furnace bundles	39.00 to	40.00
Heavy turnings	30.00 to	
RR steel wheels	45,00 to	
RR spring steel		
Tradition in Steel	45.00 to	
Rails 18 in, and under	58,00 to	60,00
Cupola cast	37.00 to	38.00
Heavy breakable cast	39.00 to	4.0, 0.0
Cast iron car wheels	40,00 to	41,00
Malleable	57.00 to	58.00
Unstripped motor blocks	32,00 to	
No. 1 machinery cast	17,00 %	48.00
and a similarity desired and	44 211	4.5.00

#### Cleveland

No. 1 hvy. melting	\$32.50 10	£114.50
No. 2 hvy melting	24.99 10	
No. 1 dealer bundles	32.50 to	24.50
No. 1 factory bundles	34.50 to	25.50
No. 2 bundles	23,00 to	
At a minutes	20200 10	24.00
No. 1 bushelings	32.50 10	34.50
Machine shop turn	10,00 to	11.00
Mixed bor, and turn	14.00 to	15,00
Shoveling turnings	14.00 to	15.00
Cast iron borings	14.00 to	15.00
Cut struct'r' & plates, 2 ft		
& under	29,00 to	40,00
Drop forge flashings	33,50 to	34.50
Low phos, punch'gs, plate.	24.50 to	
Foundry steel, 2 ft & under	36.00 to	37.00
No. 1 RR heavy melting.	26,00 to	37.00
Rails 2 ft and under	56,00 to	57.00
Ralls 18 in, and under		
traus to in, and under	57,00 to	58:00
Railroad grate bars	17,00 to	18.00
Steel axle turnings	18,00 to	19.00
	48,00 to	49.00
No. 1 machinery cast	47,00 to	48,00
Stove plate	44,00 to	45.nn
Mallealde	55.00 to	60.00
Aldilledining because in the contract of the c	1127 4110 611	47-41 44-41

#### Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

#### Youngstown

No. 1 hvy, melting			\$36.50	211	\$38.00
No. 2 hvy, melting			27.00	100	28.00
No. 1 dealer bundles			36,50	tox	38,38
No. 2 bundles			260.00	10	27.00
Machine shop turn					14.00
				101	18.00
Cast from borings				tur	18.00
			38,00	to	

#### Buffalo

No. 1 hvy melting		\$29 TIT
No. 2 bvy, melting	25,50 to	26.50
	28,00 10	29,00
No. 1 dealer bundles	28,00 to	29,000
No. 2 bundles	22.50 to	23.50
Machine shop turn.	12.00 10	
Mixed bor, and turn	13,00 to	
Shoveling furnings	La mm to	
Fast from borings	14,00 to	
Low plus, plate	24.00 to	
Scrap rails, random igth	40,00.10	
Ralls 2 ft and under		
RR steel wheels	37.00 to	
RR spring steel	35.00 to	
RR couplers and knucklers	33,00 to	
No. 1 machinery east	40,000 to	
No. 1 cupola cast	24,00.10	

#### Detroit

Brokers buying prices per gro	\$27.00 to	828.00
No. 2 byy, meiting No. 1 dealer bundles	23.00 to	24,400
No. 1 dealer bundles	28,00 to	29,00
No. 2 bundles	25.00 to	
No. 1 busheling Drop forge flashings	24 00 to	27,00
Machine shop turn.	3.00 to	10.00
Mixed bor, and turn.	11,00 to	12.00
Shoveling turnings	11,00 to	12.00
Cast iron borings	11.00 to	
Low phos. punch'gs plate.	24,00 to	23,00
No. 1 cupola cast. Heavy breakable cast.	26.00 to	27 00
Stove plate	26,00 to	27.00
Automotive cast	34.00 to	25 00

#### St. Louis

No. 1 hvy. melting	832.00	to	\$22 DI
No. 2 hvy. melting	29.00	to	
No. 1 dealer bundles	32,00	ter	22.00
No. 2 bundles	22.00		23.00
Machine shop turn			17.00
Cast iron borings	17.00	110	18.00
Shoveling turnings	19.00	Tox	
No. 1 BR hvy, melting	37.00	Tes	28,000
Rails, random lengths	46,000	tax	47.00
Rails, 18 in, and under	54.00	173	55,00
Angles and splice bars	46,00	to	47.00
Std. steel car axles	44,000	to	45,00
RR specialties	44.00		45,00
Cupola cast.	44.00		45.00
Heavy breakable cast	22.00		33,00
Cast Iron brake shoes	37.00		38.00
Stove plate	27.00		28.00
Cast iron car wheels			
Rerolling rails	53.00		54.00
Unstripped motor blocks	32.00		33.00

#### Boston

Brokers buying prices per gre	es ton or	· care:
No. 1 hvy. melting	\$26.00 to	827 1111
No. 2 hvy, melting	22,00 to	24.00
No. 1 dealer bundles	26.00 to	27.00
No. 2 bundles	17.50 to	1.8,50
No. 1 busheling	23,00 to	24.00
Elec. furnace, 3 ft & under		32.00
Machine shop turn.  Mixed bor, and short turn.	9.50 to 9.50 to	10.50
Shoveling turnings	11.00 to	12.00
Clean cast, chem, borings	16,00 to	17.00
No. 1 machinery cast	32.00 to	33.00
Mixed cupola cast	27.00 to	28.00
Heavy breakable cast	27.00 to	28.00
Stove plate	26.00 to	27.00
Unstripped motor blocks.	26,00 to	27.00

#### New York

Brokers buying prices per gro	ss ton, on cars:
No. 1 byy, melting	\$35.00 to £34.00
No. 2 hvy melting	29,00 to 20,00
Not 2 dealer bundles	24 HO to 25 HH
Machine shop turn	
Mixed bor, and turn	13,00 to 14.00
Shoveling turnings	15 HO to 16 DO
Clean cast, chem, borings.	23 00 to 24.00
No. I machinery cast	34,000 to 35,000
Mixed yard cast.	29.00 to 30.00
Charging box cast	30.00 to 31.00
Heavy breakable east	
Unstripped motor blocks	27.00 to 28.00

#### Birmingham

2			
No. I hvy. melting	\$25.00		\$30,00
No. 2 hvy, melting	26.00		27.000
No. 1 dealer bundles	239-033	to	70.00
No. 2 landles			17.00
No. 1 busheling		100	10, HD
Machine shop turn.			
Shoveling turnings	24.00		25.00
Cast iron borings	12.00		
Electric furnace bundles	36.00		37.00
Elec. furnace, 3 ft & under			30.00
Har crops and plate	39.00		40.00
Structural and plate, 2 ft.,			36.00
No. 1 RR hvy. melting.			
Scrap rails, random light	42.00		
Ratis, 18 in. and under	179 (17)		
Angles & splice bars	42 000		12.00
Berelling rails	45,00		
No. 1 cupola cast:	49.00		50,00
Stove plate	49.00		241,000
Clurging box cast	22.00		27.00
Cast from car wheels	21.6, 0.0	100	
Unstripped motor blocks			10.00

#### Cincinnati

Cilicillian		
Brokers buying prices per gro-	ss ton, on	CRIS:
No. 1 hvy melting	13 HH IN 2	
No. 2 hyv. melting	\$4.50 10	- 17 LIXE
No. I dealer bundles	29,00 to	20,00
No 2 bundles		24,000
Markine shop turn.	14 110 10	15.00
Mixed bor, and furn	15.00.10	16,00
Shoveling turnings	18,000 (0.	19,00
Cast Iron borings		16.00
Low phos, 18 in, and under	28.00 to	35.00
Rails, random length		15.00
Balls, 18 in, and under	54.00 to	55.00
No. 1 cupola cast.		39,00
Hvy. breakable cast.		34.00
Drop broken cast.	47 00 10	48.00

#### San Francisco

No. 1 bvy. melting	\$22,00
No. 2 hyv. melting	20.00
No. 1 dealer bundles	28.00
No. 2 bundles	32.00
Machine shop turn	15,00
Cast fron borings .	15,00
No. 1 RR hvy, melting	
No. 1 crimola cast.	40.00

#### Los Angeles

-		
No. 1 hvy. melting		8 14 1111
No. 2 hvy, melting		22.00
No. 1 dealer bundles		30.00
		22.00
No. 2 bundles		
Machine shop turn	\$9.00 to	11.00
Shoveling turnings		11.00
Samueline curposes		11.00
that iron borings		7.1.000
Elec. furn. I ft and under		
		45.00
(foundry)		
No. 1 RR byy, melting		33.00
		38.00
No. 1 cupola cast		

#### Seattle

No. 1 hvy melting No. 2 hvy melting No. 2 bundles No. 1 cupola cast Mixed yard cast	825 mi to	\$30.00 28.00 21.00 36.00 26.00
---	-----------	---

#### Hamilton, Ont.

No. 1 hvy, melting		\$22.00
		27.00
		110,00
No. 2 bundles		22.00
Mixed steel scrap		27.00
Busheling		22.00
		32.00
		26.00
Machine shop turn		17,00
		21.00
Mixed bor, and turn		17.00
Rails, rerolling		41,00
Cast scrap	.00 to	47,00

#### S-E-G-R-E-G-A-T-E-D SCRAP IS WORTH MORE



Rub specimen with emery paper to obtain clean surface. Add 1 drop of 1.1 Nitric Acid. If there is no attack the material is STAINLESS STEEL.



Test sample with magnet. Non-magnetic results indicate that sample is one of the 18.8 stainless steels.

# Here is how to test for

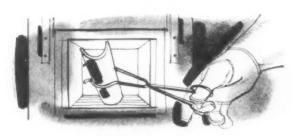
# STAINLESS STEEL TYPES 302 and 304

Last year, these two basic 18-8 stainless steel types accounted for the largest percentage of all the stainless steel produced. A recent survey among fabricators indicates that 68 percent expect to use more stainless steel in the future. To satisfy this expanding market for special steels, today's producers and fabricators require more and more scrap of known analysis.

Our personnel, equipment, experience and strategically located facilities are geared to the purchase or sale of dependably segregated metals. We welcome your inquiry.



Place specimen in a solution of Muriatic Acid (1 part water, 1 part Muriatic Acid) at a temperature of 180/190 degrees F. After 5 minutes TYPES 302, 304, 305, 316, 317, 321 and 347 will be white, while 303 will have black smudge. Then, place specimen in fresh solution of Muriatic Acid at temperature of 180/190 degrees F. Within 2 minutes there will be active attack and gas evolution on Types 302, 304, 321 and 347.



To separate Types 302 and 304 from 321 and 347, a stabilization test is necessary. Heat specimens to 1250 degrees F for 2 hours and then cool to room temperature in air. Then place specimens in cold solution of 3 parts Nitric Acid. 1 part Hydrofluoric Acid and 6 parts water. Leave for 1 hour. Remove specimens from solution and wash with water. STAINLESS TYPES 302 and 304 will have a rough granular surface.



MAIN OFFICE . PHILADELPHIA NATIONAL BANK BUILDING PHILADELPHIA 7, PENNSYLVANIA,

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PLANTS «LEBANON, PENNA «READING, PENNA «MODENA, PENNA «DETROIT (ECORSE), MICHIGAN «PITTSBURGH, PENNA «ERIE, PENNA IMPORT & EXPORT—LIVINGSTON & SOUTHARD, INC., 99 Park Ave., New York, N.Y. « Cable Address: FORENTRACO

# Zinc Will Be Off In First Half

Institute says zinc markets will follow overall industrial activity

Sales are expected to sag, then recover in June.

Last year called difficult, but "one of the better consuming years."

 There were no big surprises in the American Zinc Institute's annual review and forecast.

Said the report: "1957 has been one of the better consuming years for the zinc industry, although a difficult one overall."

About 1958, ". . . Overall consumption should parallel the national level of general industrial activity . . . consumption during the first half of 1958 will be slightly below the latter half of 1957, followed by a balancing increase in activity after June."

Here are the key statistics for 1957 compared with 1956:

	1957	1956
Mine output	530,000	512,340
Slab output	1,057,450	1,062,954
Slab shipped	959,568	1,035,311
Domestic ship.	765,132	869,270
Ship, to Govt.	179,466	157,014
Export	14,970	9,027
Slab imports	208,351	139,866
Ore imports	382,662	393,389
Smelter stocks, Dec. 31	166,655	68,622
Consumer stocks		
Oct. 31	72,111	93,896
(Short tons)	936,000	1,008,790
*Jan-Sent lates	t available	1

Of zine's three main markets only zinc-base alloys registered a gain over the previous year - 371,000 tons from 360,507 tons. Primary users are the diecasters.

Use of zinc for galvanizing

dropped from 439,146 tons in 1956 to 363,000 last year. It was the first year diecasters used more zinc than steel companies. The AZI doesn't attempt to explain the sag. It was not caused by the drop in steel production nor the use of other protective metals, and is probably only temporary, says the In-

Zine for the brass industry dropped from 124,004 tons in 1956 to 112.000 tons in 1957, due primarily to the weakening of brass

Research Planned - While the zinc industry considers itself in a "permanent and growing position" in its current markets, it says it is aware of the need to develop new ones. It is planning a research program toward this end.

Advance reports indicate it will be a major program backed by zinc and lead interests all over the world.

#### Stockpile

A Special Stockpile Advisory Committee, mainly representatives from industry and higher education, has suggested several changes to the Office of Defense Mobilization

The group was appointed by Gordon Gray, Director of Defense Mobilization, to advise on the adequacy of current stockpile programs and policies.

In releasing the report, Mr. Grav said that any action would have to await analysis and evaluation.

One of the more basic suggestions was that "emphasis be shifted from raw materials to finished items and vital supplies for survival, relief and rehabilitation."

The committee also preferred all planning be on the basis of a 3-year emergency period. Some is currently figured on a 5-year basis.

#### Copper

Kennecott Copper Corp. bought out the adjoining White Pines County, Nev., property of Consolidated Coppermines Corp. The transaction does not affect other Consolidated properties.

J. C. Kinnear, Jr., general manager. Kennecott's Nevada Mines Div., said in recent years necessary mining procedures have overlapped the perimeters of the two neighboring mines.

Tin prices for the week: Jan. 29 -93.50; Jan. 30-93.75; Jan. 31 -93.50; Feb. 3-93.125; Feb. 4 -93.00.\*

"Estimate.

#### Monthly Average Metal Prices

Cents per lb except as noted Average prices of the major nonferrous metals in January based on quotations appearing in THE IRON AGE, were as fol-

Electrolytic copper, del'd	25.692
Conn. Valley	
Copper, Lake	25.692
Straits Tin, New York	92.943
Zinc, E. St. Louis	10.00
Lead, St. Louis	12.80
Aluminum ingot	28.10
Note: Ouotations	are going prices

#### **Primary Prices**

cents per lb	Current	price	date of change
Aluminum pig	26.00	25.00	8 1 57
Aluminum ingot	28.10	27.10	8 1 57
Copper E	25.00	27.00	1 13 58
Copper CS	24.00	24.50	1 21 57
Copper L	25.00	27.00	1 13 58
Lead, St. L.	12.80	13.30	12 2 57
Lead, N. Y.	13 00	13.50	12:2:57
Magnesium ingot	36.00	34.09	8 13 56
Magnesium pig	35 25	33.75	8 13 56
Nickel	74.00	64,50	12 6 56
Titanium sponge	200 250	165-250	1 29 58
Zinc, E. St. L.	10.00	10.50	7 1 57
Zinc, N. Y.	10.50	11,00	7 1 57

ALUMINUM: 99% ingot frt allwd. COP-PER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig, Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. TIN: see above: other primary prices, pg. 149.

#### NONFERROUS PRICES

#### MILL PRODUCTS

(Cents per lh unless otherwise soted)

ALUMINUM (Base 30,000 lb, f.o.b. ship, pt., trt. allowed)

#### Flat Sheet (Mill Finish) and Plate t"F" temper except #061-0)

Allne	032	(16.)	136 249	3 250-
1100, 3003	46 6	44 3	43 6	42 7
5052	54 0	48 9	47 2	45 4
5061, 0	51 4	47 0	45 2	45 1

#### Extruded Solid Shapes

Factor	6003 T-5	6062 T-8
6 ~	45 0-46 s	no 4 64 1
12 -14	45 7-47 2	61 3 65 8
24 -26	49 0-49 5	72 1 76 8
36 35	5s 0-5s 0	96 2 99 8

#### Screw Machine Stock-2011-T-3

Size*	14	17.15	2,-1	114-114
Prov	61.0	62.5	61.0	58 6

Roofing Sheet, Corrugated (Per sheet, 26" wide base, 16,000 lb)

Isougth"-x	72	(u):	120	144
019 gage	\$1.420	\$1 893	\$2 367	\$2 539
024 gage	1.774	2 366	2 957	3 549

#### MAGNESIUM

(F.o.b. shipping Pt., varioud irt. allowed)

#### Sheet and Plate

Type↓ Gage→	250 3 00	250 2.00	188	081	032
AZ31B Stand, Grade		67 6	69.0	27.0	[08.]
AZ31B Spec.		93.3	05.7	108.7	171 3
Fread Plate			71.7		
Tooling Plate	78.0				

#### Extruded Shapes

factor +	11-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69 6	70-7	75-6	89.2
Sper. (Grade (AZ31B)	84 6	85-7	90.6	104-2

#### Alloy Ingot

AZ91B (Die Cas	sting)	37.25 (delivered)
ATERS ATORS	A 7011 Sand Casting	to be a land that the

#### NICKEL, MONEL, INCONEL

( Rase	prices, fo	b. mill	
	"A" Nickel	Monel	Inconel
Sheet, CR			128
Strip, CR	124	108	138
Rod, bar, HR	107	8.9	109
Angles, HR .	107	89	109
Plates, HR .	120	105	121
Seamless tube		129	200
Shot, blocks		87	

#### COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	48.13		45.36	48.32
Brass, 70/30	42 69	43 23	42 63	45.60
Brass, Low	44.90	45 44	44 84	47.71
Brass, R L	45 67	46 21	45 61	48 48
Brass, Naval	47 07		41 35	50 48
Muntz Metal	45.19		41.00	
Comm. Bz.	46.98	47 52	46 92	49.54
Mang. Bz.	50 81		44 91	
Phos. Br. 5%	67.17		67 67	

Free Cutting Brass Rod . . . . . . . 31.03

TITANIUM

(10,000 lb base, f.o.b. m(ll)

Sheet and strip, commercially pure, \$9,50-\$10,50; alloy, \$1,57; Plate, HR, commercially pure, \$8,50-\$8,75; alloy, \$10,75. Wire, rolled and or drawn, commercially pure, \$7,50-\$8,00; alloy, \$10,00. Har, HR or forged, commercially pure, \$6,15-\$6,30; alloy, \$6,13-\$6,25; hillets, HR, commercially pure, \$6,00-\$6,25; alloy, \$6,00-\$6,20.

#### PRIMARY METAL

THE METAL
(Cents per th unless otherwise noted)
Antimony, American, Laredo, Tex., 33.50
Beryllium aluminum 50 Be Indiae
per D contained Be
Beryllium copper, per lb conta'd He \$42.00
Beryllium 97% himp or beads.
f.o.b. Cleveland, Reading \$71.50
Rismuth ton lots 8 9 95
Bismuth, ton lots 8 2.25 Cadmium, del'd 8 1.55
Calcium, 99.9%, small lots 8 4.55
Chromium, 39.8% metallic basis 8 1.31
Cobalt, 97-99% (per lb) 82.00 to \$2.07
Germanium, per gm, f.o.b. Miami.
Okla refined39.50 to 51.00
Gold, U.S. Treas, per troy oz. \$25.00
Indiam, 99.9%, dollars per troy oz 8 2.25
Iridium, dollars per troy oz \$80 to \$90
Lithium, 5875
Magnesium, sticks, 100 to 500 lb 59.00
Mercury, dollars per 76-lb flask.
f.o.b. New York
Nielest oxide sinter at Conner
Cliff, Out, contained nickel 71.25
Palladium, dollars per troy oz \$19 to \$21
Platinum, dollars per troy oz. \$77 to \$80
Rhodium \$120,00 to \$125,00
Silver inguts (c per troy oz. t 88.625
Thorium, per kg
Vanadium \$ 3,45
Zironium sponge \$ 5.00

#### REMELTED METALS

#### Brass Ingot

	10	cuts	171	T	1	b	x1	c		£	7	r		c	L			8			
×5-		me	11																		
		115																		7	
		120																		75	
- 11		123																2	4.	111	
																		-			
1		315																- 5	-	-	
88-		2 ins	not															-			
7		210																	ß.	7	
.)	0	215																			
		~ 1:1																2	9.	23	
31.		403	. '5'			Ċ.												-	1.	-	
		421																17	3.	0.0	ì
SS-NAN Yel	o. lo. lo. low	10 ir 305 315 2 ing 210 215 245 ing 405 tnese 421	ot	r														24 10 20 20 10	629		

#### Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

0.30	copper	max.		25.25-26.2	2.
0.60	copper	max		25.00-26.0	) (
Piston	alloys	(No. 1	22 type	) 23.75-24.3	
No. 12	alum.	No. 2	grade)	21.50-22.5	
108 al	lov			21.75-22.7	7.5
195 al	lov			24.50-26.0	16
				25,00-26,0	
AVER		coppe		01 25 00 5	7 -

### Steel deoxidizing aluminum, notch bar granulated or shot

Grade	1-95-975	9	22 50-23 50
Grade	2-92-955		21.25-22.00
Grade	3-90-92/2		20.00-21.00
	1-85-90%		18.00-18.75

#### SCRAP METALS Brass Mill Scrap

scents per pound, add 1¢ per 16 for

shipments of 20,000	th and	OSSET
Copper Yellow brass Red brass Comm, bronze	Heavy 21 16%	Turnings 20 ¼ 14 ½ 17 % 18 ½ 14 ¼
Yellow brass rod ends	15%	

### Customs Smelters Scrap

to refinery)	19
No. 1 copper wire	
No. 2 copper wire	1716
Light copper	15%
*Refinery brass	17
Copper bearing material	16 16
"Dry copper content.	

### Ingot Makers Scrap

trants per pound cartoad p	nes, activered
to refinery)	
No. 1 copper wire	. 19
No. 2 copper wire	1710
Light copper	15%
No. 1 composition	17.19
No. 1 comp turnings	
Hvy. yellow brass solids	12
Brass pipe	13%
Radiators	10.9
Almminum	400 1000
Mixed old cast	125-135
Mixed new cups	
Mixed turnings dry	1336-1436

#### Dealers' Scrap

(bealess' buying price f.a.b. New York in cents per pound)

#### Copper and Brass

No. 1 copper wire	17 -17%
No. 2 copper wire	15 -15 lo 13 -13 lo
	11 -1116
	111-15
	133-14
Carbo and fancets	1115 - 12
Clean heavy vellow brass	11 -111/2
Dayley title	12 -121/2
New soft brass clippings	10 -10 %
No. 1 brass rod turnings	10 -10.55

#### Aluminum

	17 12	6
	10 -1	
1100 (28) aluminum clippings Old sheet and utensils	10 1	0.10
Borings and turnings	612	
	10 - 1	
2021 (248) clippings	11.12	-

#### Zinc

New zine	elipp	ings			4 16
Old zine -				43	334
Zine routh	1142.8			1.74	2 2
Old die ca:	st 80	THIS		112	1 4

#### Nickel and Monel

Pure nickel elippings	42-45
Clean nickel turnings	37-40
Nickel anodes	42-45
Nickel rod ends	28-29
('lean Monel turnings	20-23
tild sheet Monel	25-26
Nickel silver clippings, mixed.	18
Nickel silver turnings, mixed.	15

#### Lead

Soft scrap lead	8.16	- 9
Battery plates (dry)	3.16	
Batteries, acid free	915	2.4
Missellanous		

#### Miscellaneous

No. 1 pewter			59 60
Auto babbitt			
Mixed common babbitt			11 -111/2
Solder joints			1416-15
Siphon tops			4.2
Small foundry type			12 -12%
Monotype			12 -124
Line and stereotype .			11 -11%
Electrotype			
Hand picked type shell	3.		$7 - 71_2$
Lino, and stereo, dross			$3 - 3 \frac{1}{4}$
Electro dross			215 236

	IRON AGE		Italies ide											
	STEEL	BILLE	SLABS	OMS,	PIL- ING	STI	SHAPES RUCTUR	ALS			STR	IP		
PRICES		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Shret Steel	Carbon	Hi Str. Low Alloy	Carbon Wide Flange	Hot- rolled	Cold- rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot- rolled	Alloy Cold- rolled
	Bethlehem, Pa.			\$114.00 B3		5.325 B I	7.80 B3	5.325 B I						
	Buffalo, N. Y.	\$77.50 R3.		\$114.00 R3.		5.325 B3	7.80 B3	5.325 B3	4.925 R3,	7.15 510	7.325 B3			
	Phila., Pa.	B3	B3	B+					B3	7 70 DIS				
	Harrison, N. J.									7.70 P15				15.05.00
	Conshohocken Pa.		\$101.00 42	\$121.00 .42					4.975 .42	7.20 .42	7.325 .42			15.05 C
	New Bedford, Mass.		2101.00 .42	3121.00 /12					4.212.716	7.60 R6	1.323.42			
_	Johnstown, Pa.	\$77.50 B3	\$96.00 Bi	\$114.00 B3		5.325 B i	7.80 B3			1.09 110				
EAST	Boston, Mass.	411144								7.70 78				15.40 T
	New Haven, Conn.									7.60 D1				10.10.1
	Baltimore, Md.									7.15 T8				
	Phoenixville, Pa.					5.325 P2		5.325 P2						
	Sparrows Pt., Md.								4.925 B3		7.325 B i			
	Brid, eport, Wallingford, Conn.			\$114.00 N8						7.60 W/				
	Pawtucket, R. I. Worrester, Mass.									7.70 N7 7.70 A5				15.40 N 15.20 7
-	Alton, III.								5.125 L./					
	Ashland, Ky.								1.925 .47					
	Canton-Massillon, Dover, Ohio		\$96.00 R3	\$114.00 R3,						7.15 G#		10.45 G#		14.85 C
	Chicago, III. Franklin Park, III. Evanston, III.	\$77.50 U1, R3	\$96.00 U1. R3,W8	\$114.00 U/. R3,W8	6.225 UT	5.275 t//. W8 P/3	7.75 U1. Y1 W8	5.275 UI	4.925 W8, N4,47	7.25 A1.T8 M8			8.10 W 8, 59,13	15.05 A 59,G#
	Cleveland, Ohio									7.15 45, 3		10.45 .45	8.10 /5	
	Detroit, Mich.			\$114.00 RS					5.025 G i	7.25 M2.D1	7.425 G3	10.60 D2	8.10 G3	
	Anderson, Ind.								M2	D2,G3,P11		10.55 63		-
-	Duluth, Minn.									7.15-G4				-
DLE WEST	Gary, Ind. Harbor, Indiana	\$77.50 U1	\$96.00 U1	\$114.00 U1,		5.275 UI.	7.75 U1. 13	5.275 / 1	4.925 U1. 15, Y1	7,15 Y/	7,325 U1. 13, Y1	10.60 Y/	8.10 UI, YI	
MIDDLE	Sterling, III.	\$77.50 N#				5.275 N4			5.025 N#					
-	Indianapolis, Ind.	211100 (11				0.010111				7.30 /3				15.20 /
	Newport, Ky.												8.10 .49	11100 7
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		\$96.00 51. C10	\$114.00 C10,S1					4.925 R3, S1	7.15 R3,T4 SI	7.325 R3.	10.50 S/ 10.45 R3	8.10 5/	15.05 S
	Owensboro, Ky.	\$77.50 G5	\$96.00 G5	\$114.00 G5										
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Aliquippa, Pa.	\$77.50 UI. P6	\$96.00 U1, C11,P6	\$114.00 U1, C11.B7	6.225 U1	5.275 UI. J3	7.75 UI. Ji	5.275 U1	4.925 P6	7.15 J3,B4, S7			8.10 59	15.05 55
	Weirton, Wheeling, Follansbee, W. Va.				6.2251/3	5.275 W 3			4.925 W 3	7.15 W3,F3	7.325 W i	10.50 W3		
	Youngstown, Ohio	\$77.50 R3	\$96.00 Y/. C/0	\$114.00 Y/			7.75 Y/			7.15 Y1,J3	7.325 UI. YI	10.65 Y/	8.10 U1, V1	15.05 / 10.65 Y
	Fontana, Cal.	\$88.00 K1	\$105.50 K1	\$135.00 K/		6.075 K/	8.55 K /	6.225 K1	5.675 K1	9.00 K/				
	Geneva Utah		\$96.00 C7			5.275 C7	7.75 C7							
	Kansas City, Mo.					5.375 52	7.85 52						8.35 52	
ST	Los Angeles, Torrance, Cal.		\$105.50 B2	\$134.00 B2		5.975 C7. B2	8.45 B2		5.675 C7. B2	9.05 /3			9.30 B2	17.25 /
WEST	Minnequa, Colo.					5.575 C6			6.025 C6	9.10 K/				
	Portland, Ore.					6.025 02								
	San Francisco, Niles, Pittsburg, Cal.		\$105.50 B2			5.925 B2	8.40 B2		5.675 C7. B2					
_	Seattle, Wash.		\$109.50 B2			6.025 B2	8.50 B2		5.925 B2					
	Atlanta, Ga.					5.475 A8			5.125 48					
SOUTH	Fairfield, Ala. City, Birmingham, Ala.	\$77.50 T2	\$96.00 72			5.275 T2, R3,C16	7.75 T2		4.925 T2, R3,C16		7.325 T2			
20	Houston, Lone Star, Texas		\$101.00 52	\$119.00 52		5.375 S2	7.85 52						8.35 S2	

	STEEL				SHE	ETS				WIRE	TINP	LATE+	PLATE
1	PRICES	Hot-rolled 18 gs. & hvyr.	Cold- rolled	Galvanized	Enamel- ing	Long Terne	H.Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 7.25 lb. base box	Electro* 0.25 lb. base box	Hollowar Enamelin 29 ga
	Bethlehem, Pa. Buffalo, N. Y.	4.925 B3	6.05 B3				7.275 B	8.975 B3		6.15 W6	† Special co	oated miz.	
	Claymont, Del.										terne deduct	50c from	
	Coatesville, Pa.										blackplate 55 to 128 lb. deduct \$2.20 from 1.25 lb. coke base box. © COKES: 1.50-lb. add 25c. ELECTRO: 0.50-lb. add 25c; 0.75-lb. add 65c; 1.00-lb. add \$1.00. Differ-		
	Conshohorken, Pa.	4.975 42	6.10 .42				7.325 42						
_	Harrisburg, Pa.												
	Hartford, Conn.												
1351	Johnstown, Pa.				-			-		6.15 B3	ential 1.00 II add 65c.	b. 0.25 lb.	
	Fairless, Pa.	4.975 U1	6.10 UI				7.325 U1	9.025 UT		4.13 25	\$10.15 U/	\$8.85 U/	
	New Haven, Conn.	4.312.01	0.10 (				1.25201	2.02.3			210.13.07	\$0.02 07	
	Phoenixville, Pa.												
	Sparrows Pt., Md.	4.925 B3	6.05 B3	6.60 Bi			7.275 B3	8.975 B3	9.725 B3	6.25 B3	\$10.15 B3	\$8.85 B3	
	Worrester, Mass.									6.45 .45			
	Trenton, N. J.												
-	Alton, III.									6.35 L/			
	Ashland, Ky	4.925 .47		6.60 .47	6.625 .47								
	Canton-Massillon, Dover, Ohio			6.60 R3, R1									
	Chicago, Joliet, Ill.	4.925 W8,					7.275 UT			6.15 A5, R3,W8, N4, K2			
	Sterling, III.	-								6.25 N4. K2			
	Cleveland, Ohio	4,925 R3,	6.05 R3,		6.625 R3		7.275 R3.	8.975 R3,		6.15 .45			
	Detroit, Mich.	5.025 G3, M2	6.15 G3 6.05 M2				7.375 G3	9.075 G3					
	Newport, Ky	4.925 .47	6.05 4/										
WEST	Gary, Ind. Harbor, Indiana	4.925 UI. 13,YI	6.05 U1, 13, Y1	6.60 UI.	6.625 U1. 13, Y1	7.00 U/	7.275 U1, Y1,13	8.975 U1, Y7		6.15 Y/	\$10.05 U1. Y1	\$8.75 /3. U1, Y1	7.50 UI.
MIDDLE	Granite City, III.	5.125 GZ	6.25 G2	6.80 G2	6.825 GZ							\$8.85 G2	7.60 G2
Z	Kokomo, Ind.			6.70 C9						6.25 C9			
	Mansfield, Ohio		6.05 E2			7.00 E2							
	Middletown, Ohio		6.05 47	6.60 .47	6.625 .47	7.00 .47							
	Niles, Warren, Ohio Sharon, Pa.	4.925 R3, N3,S1	6.05 R3	6.60 R3	6.625 N3.	7.00 N3. S1,R3	7.275 Ri	8.975 SI, R3				\$8.75 R3	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Donora, Pa. Aliquippa, Pa.	4.925 U1, J3,P6	6.05 U1, J3,P6	6.60 UI.	6,625 UI	U,KU	7.275 UI. J3	8.975 UI.	9.725 UI	6.15 A5, J3,P6	\$10.05 U1, J3	\$8.75 UI. J3	7.50 UI, J3
	Portsmouth, Ohio	4.925 P7	6.05 P7							6.15 P7			-
	Weirton, Wheeling, Follansbee, W. Va.	4.925 W3, W5	6.05 W3. F3.W5	6.60 W3, W5		7.00 W3,	7.275 W 3	8.975 W3		4.12 [7	\$10.05 16'5,	\$8.75 W5, W3	7.50 W5
	Youngstown, Ohio	4.925 U1,	6.05 Y/		6.625 Y/		7.275 Y/	8.975 Y/		6.15 Y/			
	Fontana Cal.	5.675 K1	7.30 K/				8 025 K/	10.275 K/			\$10.86 K/	\$9.50 K1	
	Geneva, Utah	5.025 C7											
	Kansas City, Mo.									6.40 52			
WEST	Los Angeles, Torrance, Cal.									6.95 B2			
25.	Minnequa, Colo.									6.40 C6			
	San Francisco, Niles, Pittsburgh, Cal.	5.625 C7	7.00 C7	7.35 C7						6.95 C7	\$10.80 C7	\$9.50 C7	
	Seattle, Wash.												
	Atlanta, Ga.												
SOUTH	Fairfield, Ala. Alabama City, Ala.	4.925 T2, R3	6.05 T2. R3	6.60 T2. R3						6.15 T2, R3	\$10.15 72	\$8.85 T2	
5	Houston, Tex.									6.40 S2			

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	STEEL			BA	RS				PLA'	TES		WIRE
PRICES  Bethlehem, Pa.  Buffalo, N. Y.		Carbont	Develope		Alloy	Alloy	Hi Str.	Carbon		1 63	Hi Str.	
		Carbon† Steel	Reinforc- ing	Cold Finished	Hot- rolled	Cold	H.R. Low Alloy	Steel	Floor	Alloy	Alloy	Mirs'. Bright
					6.475 B3	8.775 B3	7.925 B3					
	Buffalo, N. Y.	5.425 R3,B3	5.425 R3,B3	7.35 B5	6.475 B3,R3	8.775 B3,B5	7.925 B3	5.10 B3		7.20 B		7.65 W 6
	Claymont, Del.	-						5.10 C+		7.20 C4	7.625 C4	
	Coatesville, Pa.							5.10 7.4		7.20 L4	7.925 L#	
	Conshohocken, Ps.							5.20 A2	6.175 .42	7.20 42	7.625 42	
	Harrisburg, Pa.							5.10 P2	6.275 P2			
	Milton, Pa.	5.575 M7	5.575 M7									
EAST	Hartford, Conn.			7.80 R3		9.075 R3	7.925 Bi					
E	Johnstown, Pa.	5.425 B3	5.425 B3		6.475 B3			5.10 B3		7.20 Bi	7.625 B3	7.65 B3
	Fairless, Ps.	5.575 U1	5.575 U1		6.625 U1							
	Newark, N. J. Camden, N. J.			7.75 W 10 7.75 P 10		8.95 H 10 8.95 P 10						
	Bridgeport, Conn. Putnam, Conn. Willimantic, Conn.			7.85 W 10 7.80 J3	6,55 N8	8.925 N8						
	Sparrows Pt., Md.		5.425 B3	-				5.10 B3		7.20 B3	7.625 B3	7.75 B3
	Palmer, Worcester, Readville, Mass. Mansfield, Mass.			7.85 B5,C14		9.075 A5,B5						7.95 .45, W 6
	Spring City, Pa.			7.75 K4		8.95 K+						
- m	Alton, III.	5.625 <i>L1</i>										7.85 L1
	Ashland, Newport, Ky.							5.10 47,47		7.20 41		
	Canton, Massillon, Ohio			7,30 R3,R2	6.475 R3, T5	8.775 R3,R2, T5						
	Chicago, Joliet, Waukegan, III. Harvey, III.	5.425 U1,R3, W8,N4,P13	5.425 U1,R3, N4,P13	7.30 A5, W10,W8 B5,L2,N9	6.475 U1, R3, W8	8.775 A5, W10,W8 L2,N8,B5	7.925 U1,W8	5.10 UI, AI, W8, I3	6.175 UT	7.20 UI,W8	7.625 U1,W8	7.65 A5,R W8,N4, K2,W7
	Cleveland, Ohio Elyria, Ohio	5.425 R3	5.425 R3	7.30 A5,C/3 C/8		8.775 A5. C/3, C/8	7.925 R3	5.20 R3,J3	6.175 /3		7.625 R3.	7.65 A5, C/3
	Detroit, Mich.	5.525 G3	5.775 G3	7.55 P i 7.50 P8.B5	6.475 R5 6.575 G3	8.775 R5 8.975 B5,P3, P8	8.025 G3	5.20 G3		7.35 G3		
ST	Duluth, Minn.											7.65 .45
MIDDLE WEST	Gary, Ind. Harbor, Crawfordaville, Hammond, Ind.	5.425 U1.13, Y1	5.425 U1,13, Y1	7.30 R3,J3	6.475 U1,13, Y1	8.775 R3,M4	7.925 U1, Y1	5.10 U1,13, Y1	6,175 /3,/3	7,20 U1, Y1	7.625 UI. YI.I3	7.75 M4
MID	Granite City, III.							5.30 G2				
	Kokomo, Ind											7.75 C9
	Sterling, Ill.	5.525 N#	5.525 N#					5.10 N4				7.75 K2
	Niles, Warren, Ohio Sharon, Pa.			7.30 C10	6.475 C10,S1	8.775 C10	7.925 SI	5.10 R3,S1		7.20 SI	7.625 R3. S1	
	Owensboro, Ky.  Pittsburgh, Midland, Donora, Aliquippa,	5.425 G? 5.425 U1, J3	5.425 U1, J3	7.30 A5,B4, R3,J3,C11,	6.475 G5 6.475 U1, J3, C11,B7	8.775 A5, W10,R1,S9,	7.925 U1, J3	5.10 U1, J3	6.175 UI	7.20 U1, J3, B7	7.625 U1.J3. B7	7.65 A5, J3.P6
	Pa.			W10,59,C8		C11,C8			-			
	Weirton, Wheeling, Follansbee, W. Va.							5.10 W5				7,65 P7
	Youngstown, Ohio	5.425 U1,R3, Y1	5.425 U1,R3, Y1	7.30 A5, Y1, F2	6,475 UI, YI	8.775 Y1,F2	7.925 U1, Y1	5.10 UI,R3, YI		7.20 Y/	7.625 UI, R3, YI	7.65 Y/
	Emeryville, Cal. Fontana, Cal.	6.175 J5 6.125 K1	6.175 J5 6.125 K1		7.525 K1		8.625 K1	5.90 K1		8.00 K1	8.425 K /	
	Geneva, Utah					-		5.10 C7			7.625 (7	
	Kansas City, Mo.	5.675 52	5.675 S2		6.725 S2		8.175 S2					7.90 52
T	Los Angeles, Torrance, Cal.	6.125 C7,B2	6.125 C7,B2	8.75 R3,P14	7.525 B2	10.65 P14	8.625 B2					8.60 B2
WEST	Minnegua, Colo.	5.875 C6	5.875 C6					5.95 C6				7.90 C6
	Portland, Ore.	6.175 02	6.175 02									
	San Francisco, Niles, Pittsburg, Cal.	6.125 C7 6.175 B2	6.125 C7 6.175 B2				8.675 B2					8.60 C7 C6
	Seattle Wash.	6.175 B2.N6	6.175 B2				8.675 B2	6.00 B2		8.10 B2	8.525 B2	
H	Atlanta, Ga. Fairfield, Ala. City,	5.625 A8 5.425 T2 R3	5.625 A8 5.425 T2,R3,	7.90 C/6			7.925 T2	5.10 T2,R3			7.625 T2	7.85 A8 7.65 T2,R
SOUTH	Birmingham, Ala.	C16	C16		6 795 59					7 20 52		
-	Houston, Ft. Worth, Lone Star, Tex.	3.015.32	5.675 S2		6.725 S2		8.175 S2	5.20 S2 5.20 L3		7.30 S2	7.725 S2	7.90 S2

#### STEEL PRICES

#### **Key to Steel Producers**

With Principal Offices

Al Acme Steel Co., Chicago

A2 Alan Wood Steel Co., Conshohocken, Pa. A3 Allegheny Ludlum Steel Corp., Pittsburgh

American Cladmetals Co., Carnegie, Pa. American Steel & Wire Div., Cleveland

46 Angel Nail & Chaplet Co., Cleveland Armco Steel Corp., Middletown, Ohio

Atlantic Steel Co., Atlanta, Ga.

49 Acme Newport Steel Co., Newport, Ky.

Bt Babrock & Wilcox Tube Div., Beaver Falls, Pa.

Bethlehem Pacific Coast Steel Corp., San Francisco Bethlehem Steel Co., Bethlehem, Pa. B2

Blair Strip Steel Co., New Castle, Pa.

RS Bliss & Laughlin, Inc., Harvey, Ill.

B6 Brook Plant, Wickwire Spencer Steel Div., Birdsborg, Pa.

A. M. Byers, Pittsburgh

88 Braeburn Alloy Steel Corp., Braeburn, Pa.

Calstrip Steel Corp., Los Angeles

C7 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.

Claymont Products Dept., Claymont, Del.

Colorado Fuel & Iron Corp., Denver

C7 Columbia Geneva Steel Div., San Francisco C8 Columbia Steel & Shafting Co., Pittsburgh

Continental Steel Corp., Kokomo, Ind. C10 Copperweld Steel Co., Pittsburgh, Pa.

C11 Crucible Steel Co. of America, Pittsburgh C12 Cumberland Steel Co., Cumberland, Md.

C/3 Cuyahoga Steel & Wire Co., Cleveland

C/4 Compressed Steel Shalting Co., Readville, Mass.

C/5 G. O. Carlson, Inc., Thorndale, Pa. C/6 Connors Steel Div., Birmingham

Chester Blast Furnace, Inc., Chester, Pa.

C/8 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

DI Detroit Steel Corp., Detroit

D3 Driver Harris Co., Harrison, N. I. D# Dickson Weatherproof Nail Co., Evanston, Ill.

El Eastern Stainless Steel Corp., Baltimore

E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.

F2 Fitzsimons Steel Corp., Youngstown
F3 Follanshee Steel Corp., Follanshee, W. Va.

Granite City Steel Co., Granite City, Ill.

G3 Great Lakes Steel Corp., Detroit G4 Greer Steel Co., Dover, O.

65 Green River Steel Corp., Owenboro, Ky.

HI Hanna Furnace Corp., Detroit

12 Ingertall Steel Div. Chicago

13 Inland Steel Co., Chicago 14 Interlake Iron Corp., Cleveland

Jackson Iron & Steel Co., Jackson, O. 11

Jessop Steel Corp., Washington, Pa.
 Jones & Laughlin Steel Corp., Pittsburgh

Joslyn Mfg. & Supply Co., Chicago 15 Judson Steel Corp., Emeryville, Calif.

KI Kaiser Steel Corp., Fontana, Cal.

K2 Keystone Steel & Wire Co., Peoria

K3 Koppers Co., Granite City, Ill.

K# Kevstone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis L2 La Salle Steel Co., Chicago

Li Lone Star Steel Co., Dallas

L# Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.

M2 McLouth Steel Corp., Detroit

M3 Mercer Tube & Mfg. Co., Sharon, Pa.

M4 Mid States Steel & Wire Co., Crawfordsville, Ind.

M6 Mystic Iron Works, Everett, Mass.

M7 Milton Steel Products Div., Milton, Pa.

M8 Mill Strip Products Co., Evanston, III.

NI National Supply Co., Pittsburgh

N2 National Tube Div., Pittsburgh

N3 Niles Rolling Mill Div., Niles, O.

N# Northwestern Steel & Wire Co., Sterling, Ill.

No Northwest Steel Rolling Mills, Seattle

N7 Newman Crosby Steel Co., Pawtucket, R. I.

N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.

N9 Nelson Steel & Wire Co.

01 Oliver Iron & Steel Co., Pittsburgh

02 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.

P2 Phoenix Iron & Steel Co., Phoenixville, Pa., P3 Pilgrim Drawn Steel Div., Plymouth, Mich.

P4 Pittaburgh Coke & Chemical Co., Pittaburgh P5 Pittsburgh Screw & Bolt Co., Pittsburgh

P6 Pittsburgh Steel Co., Pittsburgh

P7 Portsmouth Div., Detroit Steel Corp., Detroit

P8 Plymouth Steel Co., Detroit

P9 Pacific States Steel Co., Niles, Cal. P10 Precision Drawn Steel Co., Camden, N. J.

P11 Production Steel Strip Corp., Detroit

P13 Phoenix Mfg. Co., Joliet, Ill.

P14 Pacific Tube Co.

P15 Philadelphia Steel and Wire Corp.

RI Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.

R3 Republic Steel Corp., Cleveland

R4 Roebling Sons Co., John A., Trenton, N. J.

R5 J. & L. Steel Co., Stainless Div.

R6 Rodney Metals, Inc., New Bedford, Mass.

R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.

52 Sheffield Steel Div., Kansas City 53 Shenango Furnace Co., Pittsburgh

S4 Simonds Saw and Steel Co., Fitchburg, Mass. S5 Sweet's Steel Co., Williamsport, Pa.

S6 Standard Forging Corp., Chicago

S7 Stanley Works, New Britain, Conn.

S8 Superior Drawn Steel Co., Monaca, Pa.

S9 Superior Steel Corp., Carnegie, Pa. \$10 Seneca Steel Service, Buffalo

511 Southern Electric Steel Co., Birmingham

71 Tonawanda Iron Div., N. Tonawanda, N. Y.

T2 Tennessee Coal & Iron Div., Fairfield

73 Tennessee Products & Chem. Corp.. Nashville

T4 Thomas Strip Div., Warren, O.

75 Timken Steel & Tube Div., Canton, O.

77 Texas Steel Co., Fort Worth 78 Thompson Wire Co., Boston

Ul United States Steel Corp., Pittsburgh

U2 Universal Cyclops Steel Corp., Bridgeville, Pa.

1/3 Ulbrich Stainless Steels, Wallingford, Conn. U4 U.S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.

W2 Washington Steel Corp., Washington, Pa-

W3 Weirton Steel Co., Weirton, W. Va

W4 Wheatland Tube Co., Wheatland, Pa.

W5 Wheeling Steel Corp., Wheeling, W. Va. W6 Wickwire Spencer Steel Div., Buffalo

W7 Wilson Steel & Wire Co., Chicago

W8 Wisconsin Steel Div., S. Chicago, Ill. W9 Woodward Iron Co., Woodward, Ala.

W10 Wyckoff Steel Co., Pittsburgh W/2 Wallace Barnes Steel Div., Bristol, Conn.

Y/ Youngstown Sheet & Tube Co., Youngstown, O.

CEASE ECC

#### PIPE AND TUBING

3

Base discounts pet f.o.b. mills. Base price about \$200 per net ton.

							BUT	TWELD										SEA	MLESS			
		ln.	34	la.	1	In.	11	In.	11	In.	2	In.	21/2	3 In.	2	In.	2	In.	3	ln.	31	-4 In.
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Bik.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Bik.	Gal.	Blk	Gal.	Blk.	Gal.
Sparrows Pt. B3 Youngstown R3 Fontana K1 Pittsburgh J8 Alton, III. L1 Sharon M3 Fairleas N2 Pittsburgh N1 Wheeling W3 Wheatland W4 Youngstown Y1 Indiana Harbor V7 Lorain N2 Lorain N2	5 25 5 25 5 25 5 25 5 25 5 25 5 25 5 25	+10.0 +12.0 +10.0 +10.0 +10.0 +10.0	6.25 8.25 +5.25 8.25 6.25 8.25 8.25 8.25 8.25 8.25 8.25 8.25 8	+6.0 +19.5 +6.0 +8.0 +6.0 +6.0 +6.0 +6.0 +7.0	9. 75 11. 75 9. 75 11. 75 11. 75 11. 75 11. 75	+1.50 +15.00 +1.50 +3.50 +1.50 +3.50 +1.50 +1.50 +1.50 +1.50 +1.50 +2.50	14.25 0.75 14.25 12.25 14.25 14.25 14.25 14.25 14.25 14.25 14.25	+0.75 +14.25 +0.75 -2.75 -0.75 +0.75 +0.75 +0.75 +0.75 +0.75 +1.75	14.75 14.75 12.75 14.75 14.75 14.75 14.75 14.75 14.75 14.75	0 25 +13 25 0 25 +1 75 0 25 +1 75 0 25 0 25 0 25 0 25 0 25 +0 75	15. 25 1. 75 15. 25 13. 25 15. 25 15. 25 15. 25 15. 25	0.75 +12.75 0.75 +1.25 0.75 +1.25 0.75 0.75 0.75 0.75 +0.25	16.75 14.75 16.75	0.50 +13.00 0.50 +1.50 0.50 +1.50 0.50 0.50 0.50 +1.00	*9.25	+24.2	5 *2.75 5 *2.75	i + 19.5i i + 19.5i i + 19.5i i + 19.5i	0 *0.25 0 *0.25	+17.0	1.25	+15.50 +15.50 +15.50 +15.50
EXTRA STRONG PLAIN ENDS Sparrows Pt. B! Youngstown R! Fairleas N? Forlana K! Forlana K! Fitsburgh f! Alton, Ill. L! Wheeling W! Wheatland W! Youngstown Y! Indiana Harbor Lorain N?	7.75 9.75 7.75 9.75 7.75 9.75 9.75 9.75	+4.0 +6.0 +4.0 +4.0 +4.0 +4.0 +4.0 +4.0 +5.0	13.75 11.75 0.25 13.75 11.75 13.75 13.75 13.75 13.75 13.75	list +2.0 list +2.0 list list list list +1.0	16.75 14.75 3.25 16.75	4.50 2.50 4.50 2.50 4.50 4.50 4.50 4.50 4.50 3.50	17.25 15.25 17.25 17.25 17.25 17.25 17.25 17.25 17.25 17.25	3. 25 1. 25 3. 25 1. 25 3. 25 3. 25 3. 25 3. 25 3. 25 2. 25	17.75 15.75 4.25 17.75 15.75 17.75 17.75 17.75 17.75	4.25 2.25 4.25 4.25 4.25 4.25 4.25 3.25	18.25 4.75 18.25 16.25 18.25 18.25 18.25 18.25 18.25	4,75 2,75 4,75 4,75 4,75 4,75 4,75 4,75 3,75	5 16. 75 5 18. 75 6 16. 75 6 16. 75 6 18. 75	3.50 1.50 3.50 3.50 3.50 3.50 3.50 3.50	*7.75 *7.75	+21.7	5 *0.25 5 *0.25	6 +16.0 6 +16.0 6 +16.0	2.25	+13.50 +13.50 +13.50	7.25	+8.50

Threads only, buttweld and seamless 21, pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 51; pt. higher discount. Galvanized discounts based on zinc price range of over 9c to 11c per lb. East St. Louis. For each 2c change in zinc, discounts vary as follows: 12, 34 and 1-in., 2 pt.; 114, 11; and 2-in., 11c, pt.; 21; and 3-in., 1 pt., e.g., sinc price range of over 13c to 15c would lower discounts on 21; and 3-in., pipe by 2 points; zinc price in range over 7c to 9c would increase discounts. East St. Louis zinc price now 10c per lb.

(Effective Feb. 3, 1958)

#### TOOL STEEL

F. 0. b	mill					
11.	Cr	1.	Mo	Co	per lb	SAL
18	1			_	\$1.795	T-1
Is	1	1		5	2.50	T-1
18	4	2			1.06	T-3
	4	1.5	8		1.155	21-1
	4		6		1.545	M-3
	1	2			1.20	31-2
High	-carbo	n chi		m	.925 D	
	arden				.475	0-2
Speci	al car	rbon			_36	111
Extra	ear)	out :			-36	111
Regu	lar ca	rbun				111
					id east o	
sissip	pi ar	e de	per	lb h	lgher. W	est of
Missi	ssippi	6-c 1	ich+r			

CLAD	STEEL	Dan mine	cents per lh t o	

	Plate	A5. J2.	L4, C4	Sheet /2
Cladding	10 pct	15 pct	20 pct	20 pct
302				37.50
304	37.95	42.25	46.70	40.00
316	44.40	49.50	54.50	58.75
321	40.05	44.60	49.30	47.25
347	42.40	47.55	52.80	57.00
405	29.85	33.35	36.85	
410	29.55	33.10	36.70	
430	29.80	33.55	37.25	
	302 304 316 321 347 405	Cladding 10 pct 302 304 37.95 316 44.40 321 40.05 347 42.40 405 29.85 410 29.55	Cladding 10 pct 15 pct  302  304 37.95 42.25  316 44.40 49.50  321 40.05 44.60  347 42.40 47.55  405 29.85 33.35  410 29.55 33.10	302 304 37.95 42.25 46.70 316 44.40 49.50 54.50 321 40.05 44.60 49.30 347 42.40 47.55 52.80 405 29.85 33.35 36.85 410 29.55 33.10 36.70

('R Strip (S9) Copper, 10 pct, 2 sides, 40.25; 1 side, 33.95.

#### RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bara	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer U/ Cleveland R3 So. Chicago R3	5.525	6.59	6.975	9.75			14.75
Ensley T2 Fairfield T2 Gary U1	5,525	6.50		9.75		6.60	
Hunting on C/6 Ind. Harbor 15 Ind. Harbor Y/	5.525		6.975	9.75 9.75		6.60	
Johnstown B) Joliet U/ Kansas City S2		6.50	6.975	9.75			14.75
Lackawanna Bi Lebanon Bi Minnegua Co			6.975 6.975 6.975		14,50	6.60	14.75
Pittsburgh /	0.323	1.00	0,313	9.75			14.75
Steelton Bi Struthers Y	5.525		6.975	9.75		6.75	15.75
Torrance C7 Williamsport S5 Youngstown R		6.50		9.75		6.75	

#### COKE

Furnace, bechive (f.o.b.)		Net-Ton
Connellsville, Pa	\$15.00	to \$15.75
Foundry, beehive (f.o.b.)		
	\$17.50	to \$19.00
Foundry even coke	4	
Buffalo, del'd		\$31.75
Detroit, t.o.b.		30.50
New England, del'd		31.55
Kearney, N. J., f.o.b		29.75
Philadelphia, f.o.b		
Swedeland, Pa., f.o.b		29.50
Painesville, Ohio, f.o.b.		30.50
Erie, Pa., f.o.b.		30.50
Cleveland, del'd		32.65
Cincippati del'd		
Cincinnati, del'd		** 01.04
St. Paul, f.o.b		29.10
St. Louis, f.o.b.		31.50
Birmingham, f.o.b		28.85
Milwaukee, f.o.b		30.50
Neville, Is., Pa		29.25

#### LAKE SUPERIOR ORES

51.50% Fe nat lower Lake ports Freight changes	. Price	es for 19	57 season.
A T T SAIN TO THE SAIN THE SAI			Gross Ton
Openhearth lump			
Old range, besse	mer .		11.85
Old range, nonbe			
Mesabi, bessemer			
Mesabi, nonbesse			
High phosphorus	****		11.45

#### ELECTRICAL SHEETS

22-Gage	Hot-Rolled	Cold-R Coiled or (	
F.o.b. Mill Cents Per Lb	Cut Lengths)*	Semi- Processed	Fully Processed
Field		9.625	
Armature	11.10	10.85	11.35
Elect.	11.80	11.55	12.05
Special Motor		12.10	
Motor	12.90	12.65	13.15
Dynamo	13.95	13.70	14.20
Trans. 72	15.00	14.75	15.25
W 0.0	15.55	23.10	10.00
Irans. 65	10.00	Grain (	)riented
Trans. 58	16.05	Trans. 66	20 28
Trans. 52	17.10	Trans. 80	19.20
		Trans. 73	19.70

Producing points: Beech Bottom (W5); Brackenridge A31; Granite City (G2); Indiana Harber (I3); Manafield E21; Newport, Ky. (N5); Niles, O. (N5); Vandergrift U1; Warren, O. (R3); Zaneaville, Butler (A7).

#### **ELECTRODES**

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

(	GRAPHITE		CARBON*			
Diam.	Length In.	Price	Diam.	Length (In.)	Price	
24	84	26.00	40	100,110	10.70	
20	72	25.25	35	110	10.70	
18	72	25.75	30	110	10.85	
14	72	25.75	24	72 to 84	11.25	
12	72	26,25	20	90	11.00	
10	60	28.00	17	72	11.48	
10	48	28.50	14	72	11.85	
7	60	28.25	12	60	12.95	
6	60	31.50	10	60	13.00	
4	40	35.00	8	60	13.30	
3 2	40	37.00				
212	30	39.25				
2	24	60.75				

\* Prices shown cover carbon nipples.

#### REFRACTORIES

#### Fire Clay Brick

First quality, Ill., Ky., Md., Mo., O	
(except Salina, Pa., add \$5,00)	F195 0
No. 1 Ohio	
Sec. Quality, Pa., Md., Ky., Mo., Ill.	120.0
No. 2 Ohio	193.0
Ground fire clay, net ton, bulk	
(except Salina Pa add \$2.00)	91.5

#### Silica Brick

Continue distance in the contract of the contr		
Chicago District 1	60	331
Western Utah	7.5	.00
California		
Hays, Pa., Athens, Tex., Wind-		
ham, Warren, O., Morrisville		
157.00-1	GB	.00
Silica cement, net ton, bulk, Latrobe	28	
Silica cement, net ton, bulk, Chi-		
rago	25	
Silica cement, net ton, bulk, Ens-		

Mt. Union, Pa., Ensley, Ala. ..... \$150.00 Childs, Hays, Pa.

ilica cement.	net ton,	bulk. Ens-
ley, Ala	net ton,	bulk, Mt.
Union ilica cement,	net ton.	bulk, Utah
and Calif. ,	*******	

### Chrome Brick Per net ton Standard chemically bonded, Balt.\$105.00 Standard chemically bonded, Curt-iner, Calif. 115.00 Burned, Balt. 99.00

#### Magnesite Brick

Standard	Baltimore			\$131.00
Chemicall	y bonded,	Baltim	re	 116.00

Grain Ma	gnesire	St	76 TO	· to-in	grains
Domestic.	f.o.b. I	Baltim	ore i	n bulk.	\$73.00
Domestic.		hewal	ah, Y	Wash.,	
Luning.					
in bulk		****			46.00
in sack	S	* * * * * *			0-54.00

Dead	Burn	ed	Do	lo	mi	te	2		T.	e	y.	net	ton
F.o.b.	bulk.											51	6.75
Mid	west souri											1	7.00

(Effective Feb. 3, 1958)

#### MERCHANT WIRE PRODUCTS

	Standard Q Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galy, Barbed and Twisted Barbleas Wire	Merch. Wire Ann'ld	Merch. Wire Galv.
F.o.b. Mill	Col	Col	Col	Col	Col	e lb.	e lb.
Alabama City R3	173	187		212	193	8.65	9.20
Aliquippa /3***	173	190			190		9.325
Atlanta 48**	175	192		214	198	8.75	9.425
Bartonville K2**	175	192	178	214	198		9.425**
Buffalo Wo							8.95*
Chicago N4"	173	190	172	212	196	8.65	9.325
Cleveland 46							
Cleveland 45						8.65	
Crawf'day. M4 **	175	192		214	198	8.75	9.425
Donora, Pa. 45	173	187			193		9.20
Duluth 45	173	187			193		9.20
	173	187		212	193	8.65	9.20
Galveston D4	9.10:						
Houston 52	178	192			198		9.45
Jacksonville M#		197		219	203		9.675
Johnstown Bira	173	190	172		196 **		9.325**
Joliet, Ill. 45	173	187			193		9.20
Kokomo C9*	175	189		214	195"		9.30*
L. Angeles B?***							10.275
Kansas City S2"		192			198"		9.45
Minnequa Co	178	192	177	217	198		9.45
Monessen Po					193		9.20
Palmer, Mass. Wo							9.50*
Pittsburg, Cal. C7		210			213		10.15
	173	187			193	8,65	
So. Chicago R3	173	187			193		9.20
S. San Fran. Co				236		9.60	10.15
SparrowsPt.B3**	175				198	8.75	9.425
Sterling,Ill. N+""	175	192	172	214	198		9.425
Struthers, O. Y/'						8.65	
Worcester A5	179					8.95	9.50
Williamsport S5							

\* Zine less than .10¢.

\*\* 11-12¢ zinc.

\*\*\* 10¢ zinc.

† Plus zinc extras.

‡ Wholesalers only.

#### C-R SPRING STEEL

		CARB	ON CO	ONTEN	г
Centa Per Lb F.o.b. Mill			0.61-0.80	0.81 1.05	
Baltimore, Md. 78	9.50	10.40	12.60	15.60	18.55
Bristol, Conn. W/2		10.70	12,90	16.10	19.30
Boston 78	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. R7	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. 59	8.95	10.40	12.60	15,60	18.55
Cleveland 45	8.95	10.40	12.60	15.60	18.55
Dearborn S/	9.05	10.50	12.70		
Detroit D/	9.05	10.50	12.70	15.70	
Detroit D2	9.05	10.50	12.70		
Dover, O. G4			12.60	15.60	18.55
Evanston, Ill. M8			12.60		
Franklin Park, Ill. 78	9.05	10.25	12.45	15.45	18.40
Harrison, N. J. C//			12.90	16.10	19.30
Indianapolis /3			12.60	15.60	18.55
Los Angeles C/			14.80	17.80	
New Castle, Pa. B4			12.60	15,60	
New Haven, Conn. D1			12.90	15.90	
Pawtucket, R. L. N7			12.90	15.90	18.85
Pittaburgh 57			12.60	15.60	18.55
Riverdale, Ill. A/			12.60	15.60	18.55
Sharon, Pa. SI			12.60	15.60	18.55
Trenton, R4			12.90	16.10	19.30
Wallingford W/			12.90	15.90	18.55
Warren, Unio 19			12.60	15.60	18.75
Worcester, Mass. A5			12.90	15.90	18.85
Youngstown J3	8.95	10.40	12,60	15.60	18.55

#### BOILER TUBES

_					
\$ per 100 ft. carload lots.	S	ize	Sean	nless	Elec. Weld
cut 10 to 24 ft. F.o.b. Mill	OD- la.	B.W. Ga.	H.R.	C.D.	H.R.
Babcock & Wilcox	2 2 3 3 3	13 12 12 11 10	65.97		35.22 47.43 54.77 63.93 85.53
National Tube	2 2 3 3 4	13 12 12 11 10	36.34 48.94 56.51 65.97 87.61	57.31 66.18	35.22 47.43 54.77 63.93 85.53
Pittaburgh Steel	2 2 3 3 3 4	13 12 12 11 10	56.51 65.97	57.31 66.18	

#### BOLTS, NUTS, RIVETS, SCREWS CAST IRON WATER PIPE INDEX

(Base discount, f.o.b. mill)
Pet. Discounts

Machine and Carriage Bolts	Full Con- tainer Price	30 Con- tainers	20,000 Lb.	40,000 Lb.
39" and smaller x 6" and shorter	49	54	56	57
5 s" thru 1" x longer than 6"	3.5	40	43	45
Rolled thread carriage bults 12 A smaller x 6 and shorter	49	54	56	57
Lag. all d'am, x 6" & shorter	49	54	56	57
Lar all diam, longer than 6 m.	39	4439	47	41.19
Plow bolts, \$2" and smaller x 6" and shorter	49	54	56	57

(Add 25 pet for broken case quantities)

Nuts, Hex, HP reg. & hvy. Full ca	se or
<sup>5</sup> 4 in, or smaller <sup>7</sup> a in to 1 in, inclusive 1 % in to 1 <sup>1</sup> 2 in, inclusive 1 % in, and larger	55 1/2
C. P. Hex, reg. & hvy.	60 %
The in to 142 in inclusive	53 14
Hot Galv. Hex Nuts (All Types)	
L in and smaller	4 12 hours

Semi-finished Hex Nuts	
5s in or smaller	604
1 in to 1 2 in inclusive	553
1% in and larger	534
(Add 25 pct for braken case or quantities)	keg

Ta in	and	smaller		****		6.3
Rivets						
				Bas	e per	100 lb
ig In	and	larger			Pet O	\$12.25 # List
7/16 1	n. ar	nd small	er			19

#### Cap Screws

Finished

Full Finished E		Package Heat Tre	
New std. hex head, pack-		ricut ite	7.4.7
aged b, diam and smaller x			
6" and shorter	40	26	
6 and shorter 5 diam, and smaller x	22	3	
longer than 6"	-8	+13	
longer than 6"+	F	+32 -1018 Ste ill-Finish artons Bu	ed
" through %" dia x 6" and shorter	58	49	
and shorter Minimum quantity—14	45	33	
diam., 15,000 pieces; 14 diam., 5,000 pieces; 3," th 2,000 pieces.	6" tl	rough 5	2 10

#### Machine Screws & Stove Bolts

Plain Finish Cartons	Quantity	Disco Mach. Screws 19	Stove
To 14" 1			
diam. incl.	25,000-200,000	9	54
5/16 to ½"   diam. incl.	25,000-200,000	9	54
All diam. over 3" long	5,000-100,000	-	54

#### Machine Screws & Stove Bolt Nuts

	Discount			
In CartonsQuantity	Hex 16	Square 19		
In Bulk				
diam. & - 15,000-100,000 smaller	7	9		

Birmingham		,	1 1															. 1	25.8
New York																		. 3	38.7
Chicago																		. 0	40.9
San Francisco	0 -	L		3	١.														48.6
Dec. 1955.		U C	11	24	ċ.		1	le	18	18		E:	;	-	)7		1	iea	vier
5 in. or large	7		30	01	1	0	2.21	d		81	oi	0	o.	È	Z	1	D	E.	Ex-
planation: p.			17			8	e	Di		- 1	1			19				1.5	18We.
Source; U. S.								5.					-						

#### **ELECTROPLATING SUPPLIES**

(Cents per lb, frt allowed in quantit	
opper	3/1
Rolled elliptical, 18 in. or longer,	2.00 3.25 4.00 6.50
Nickel, 39 pet plus, rolled carbon, 5000 lb	225
admium Fin, ball anodes \$1.13 per lb (approx.	
Chemicals	
(Cents per lb, f.o.b, shipping point, Copper cyanide, 100 lb drum 7 Copper sulphate, 100 lb bags, per	1.70
cwt 2	4.35 0.50
300 lb 4	8.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums (Philadelphia price 24.50)	4.05
Zinc cyanide, 100 lb	0.75
N. Y	8.00
Thromic acid, flake type, 10,000 lb or more 3	1.00

#### METAL POWDERS

Per pound, to b. shipping point, lots for minus 100 mesh	171	ton
Swedish sponge iron, del. East of Miss. River, ocean bags, 23,000		
Ib. and over	1.	0.50
F.O.B. Riverton or Camden, New		0.04
Jersey, freight allowed west of		
Miss. River	1	9.5€
Domestic sponge iron, 98+% Fe.		
23,000 lb. and over del'd East		
of Miss. River	11	3.5€
F.O.B. Riverton, New Jersey, West		
of Miss. River		3.5€
Canadian sponge iron, del'd in		
East, carloads	10	1.5€
Electrolytic iron, annealed,		
imported 99.5+% Fe		1.5€
domestic 99.5+% Fe	3.6	1.5€
Electrolytic iron, unannealed		
minus 325 mesh, 99 + % Fe	5	20.
Electrolytic iron melting		
stock, 99.84% pure	2	7.0€
Carbonyl iron size 3 to 20		
micron, 98%, 99.8+% Fe. 88.8¢ t	0.8	2.80
Aluminum, freight allowed Brass, 10 ton lots31.1¢ t	38	000
Brass, 10 ton lots	0.4	1.10
Copper, electrolytic		50€
Copper, reduced 40.3¢ t	0.47	3.86
Chromium, 100-199 lb. 95¢ plus meta	I Va	tine
Chromium, electrolytic, 99,85% min. Fe. 03 max. Del'd		0.00
Lend	o, pl	ant
Manganese f.o.b. Extron. Pa.	41	9.0€
Molybdenum, 99% \$3.60 t	0 \$	1.95
Nielest charries the propinity tod	S. 1	63.5
Nickel, unannealed	8	.00
Nickel, annealed	8	0.0%
Nickel, spherical, unannealed		
#80 ·····		.13
Silicon	43.	50€
Solder powder 13¢ plus met	V3	lue
Silicon Solder powder	5	.02
Stainless steel, 316	8	.50
Tin14.00¢ plus metal	V3	ine
Tungsten, 99% (65 mesh) \$3.75 (nor	11111	28.11
Zinc, 5000 lb & over17.5¢ to	0 65	-16

WARE-									Metr	opolitan	Price, do	llars per	100 lb.
HOUS			Sheeti		Strip	Plates	Shapes	В	ars.		Alloy	Bara	
Cities	City Delivery; Charge	Hot-Rolled	Cold-Rolled	Galvanized 10 gage   11	Hot-Kolled		Standard	Hot-Rolled (merchant)	Cold- Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.64	8.97	9.05	9.01	10.68				
Baltimore	\$.10	8.38	8.98	9.71	8.86	8.76	9.29	9.16	11.44"	16,18	15,18	19.73	18.98
Birmingham	.15	8.18	9.45	10.15	8.23	8.56	8.64	8.60	10.57				
Boston	.10	9.48	10.54	11,55	9.52	9.82	9.73	9.83	13.00	15.79	15.38	19.89	19.18
Buffalo	.15	8.40	9.15	11.22	8.65	9.05	9.05	8.95	11.05*	16.34	15,15	19.01	18.95
Chicago	. 15	8.35	9.60	10.15	8.38	8.71	8.79	8.75	8.95	15.80	14.80	19.35	18.60
Cincinnati	. 15	8.49	9.65	10.20	8.69	9.08	9.33	9.07	9.46	15.61	15.11	18.96	18.91
Cleveland	.15	8.33	9.60	10.10	8.48	8.94	9.16	8.84	10.95*	15.89	14.89	19.44	18.96
Denver	. 20	9.70	11.30	12.49	9.80	9.70	9.80	9.98	10.65				17.60
Detroit .	.15	8,58	9.85	10.50	8.73	9.06	9.33	9.05	9.30	15.46	15.06	18.81	18.86
Houston		7.45	8.75		7.60	8.05	7.60	7.55	11.10	16.20		19.30	19.05
Kansas City	. 20	9.02	10.27	10.07	9.05	9.38	9.46	9.42	9.87	20.02	15.47	20.02	19.27
Los Angeles	. 10	7.85**	10.85	11.75	7.90	7.90	7.95	7.90	13.35*	17.05	16.10	21.05	20.35
Memphia	.15	8,55	9.80		8.60	8.93	9.01	8.97	12,11*				
Milwaukee	.15	8.48	9.73	10.28	8.51	8.84	9.00	8.88	9.18	15.43	14.93	18.78	18.73
New York	10	8.97	10.23	10.66	9.41	9.53	9.45	9.67	12.86*	15.02	15.19	18.42	18.99
Norfolk.	.20	8.00			8.40	8.35	8.70	8.45	10.70				
hiladelphia	.10	8.10	9.00	9.97	8.79	8.87	8.60	8.75	11.61*	15.61	15.11	18.96	18.91
itteburgh	.15	8.33	9.60	10.50	8.48	8.71	8.79	8.75	10.95*	15.80	14.80	19.35	18.60
ortland		8.50	11.20	11.55	9,05	8.30	8.65	8.65	14.50	18.50	16.10	20.75	20.25
an Francisco	.10	9.45	10.85	11.10	9.55	9.70	9.60	9.80	13.10	17.05	16.10	21.05	20.35
ieattle		9.95	11.15	12.00	10.00	9,70	9.80	10.80	14.05	16.55	16.35	20.65	20.15
pokane	15	10.10	11.30	12.15	10.15	9.85	9.95	10.25	14.20		17.35	21.55	21.05
t. Louis	15	8.69	9.94	10.51	8.74	9.08	9.25	9.12	9.56	15.66	15,16	19.01	18.96
t. Paul	15	8.94	10.19	10.76	8.99	9.45	9.53	9.37	9.81		15.26		19.06

Base Quantities (Standard unless otherwise keyed); Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. \*All sizes except 18 and 16 gage. †† 10¢ zinc. ‡ Deduct for country delivery. † 3/16 in. to ½ in. \*C1018—1 in. rounds.

(Effective Feb. 3, 1958)

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. Bo	68.00	68.50	69.00	69.50	
Birmingham RS	62.00	62.50			
Birmingham 1/9	62.00	62.50"	66.50		
Birmingham L4	62.00	62.58°	66.58		
Buffalo R	66.00	66.50	67.00	67.50	
Buffalo 4/	66.00	66.50	67.00	67.50	
Buffalo H 6	66.00	66.50	67.00	67.50	
Chester P2	66.50	67.00	67.50		
Chicago 14	66.00	66.50	66.50	67 00	
Cleveland 45	66.00	66.50	66.50	67.00	71.00
Cleveland Ri	66.00	66.50	66.50	67.00	
Duluth 14	66.80	66.50	66.50	67.00	71.00
Erie /4	66.00	66.50	66.50	67.00	71.00
Everett M5	67.50	68.00	68.50		
Fontana K/	75.00	75.50			
Geneva, Utah C7	66.00	66.50			
Granite City G2	67.90	68.40	68.90		
Hubbard 1/			66.50		
Ironton, Utah C7	66.00	66.50			
Midland C//	66.00				
Minnegua C6	68.00	68.50	69.00		
Monessen Po	66.00				
Neville Is. P4	66.00	66.50	66.50	67.00	71.00
N. Tonawanda T/		66 50	67.00	67.50	
Sharpsville S3	66.00	66.50	66.50	67.00	
So Chicago R3	66.00	66.50	66.50	67.00	
So. Chicago W8	66.00		66.50	67.00	
Swedeland 42	68.00	68.50	69.00	69.50	
Toledo Is	66.00	66.50	66 50	67.00	
Troy, N. Y. R.	68.00	68.50	69.00	69.50	74.00
Youngstown Y/	-0.00		66.50	67.00	- 3100

DIFFERENTIALS: Add, 75r per ton for each 0.25 pet silicon or portion thereof over base 1.75 to 2.25 pet except low ploss, 1.75 to 2.09 pet 150 per ton for each 0.25 pet managenes or portion thereof over 1 pet, 52 per ton for 0.50 to 0.75 pet nickel, 51 for each additional 0.25 pet nickel, 51 for each additional 0.25 pet nickel, Add \$1.00 for 0.31 0.69 pet ploss.

Silvery Iron: Buffalo 6 pet, 1.17, 179.25; Jackson J. 1, 14 (Globe Div., \$78.00. Niagara Falis 15.01 15.50., \$101.00; Keokuk 14.01 14.50), \$103.50; 15.51 16.00, \$106.50, Add \$1.00 per ton for each 0.50 pet silicon over base 6.01 to 6.50 pet 109 pet 150 pet. Beasemer silvery pig iron under .10 pet ploss.; \$64.00. Add \$1.00 premium for all grades silvery to 18 pet. pct phos.; \$64. silvery to 18 pct.

Intermediate low phos.

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.00	23.75	23.25	25.25		27.00	39.75	32.25	37.00		16.75	_	17.00
Slabs, billets	27.00	27.00	28.00	31.50	32.00	33.25	49.50	40.00	46.50		21.50		21.75
Billets, forging		36.50	37.25	38.00	41.00	40.50	62.25	47.00	55.75	32.00	28.25	28.75	28.75
Bars, struct.	42.00	43.00	44.25	45.00	48.00	47.75	73.00	55.50	64.75	37.75	33.75	34.25	34.25
Plates	44.25	45.00	46.25	47.25	50.00	50.75	76.75	59.75	69.75	40.25	35.00	36.75	36.00
Sheets	48.50	49.25	51.25	52.00		55.50	81.50	65.50	79.25	48.25	40.25		40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50		44.25	69.25	53.50	63.50	-	31.00		32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00		55.50	81.50	65.50	79.25	48.25	40.25		40.75
Wire CF; Rod HR	40.00	40.75	42.00	42.75	45.50	45.25	69.25	52.50 52.75	61.50	35.75	32.00	32.50	32.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., Cl. Brackenridge, Pa., A3; Butler, Pa., A7; Vandergritt, Pa., U1; Washington, Pa., W2, J2; Baltimore, E1; Middletown, O., A7; Massillon, O., R3; Gary, U1; Bridgeville, Pa., U2; New Castle, Ind., I2.

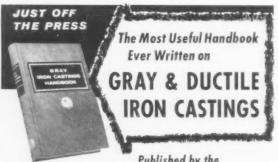
Strip: Midland, Pa., C11; Waukegan, Cleveland, A5; Carnegie, Pa., S9; McKcesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leeshburg, Pa., A5; Bridgeville, Pa., C2; Detroit, M2; Canton Massillon, O., R3; Harrison, N. J., D5; Youngstown, J5; Sharon, Pa., S1; Butler, Pa., M2; Wallingford, Conn., U4 [plus further conversion extrast; W1; New Bedford, Mass. L25e per lb higher). R6; Gary, U1; L25e per lb higher).

Bar: Baltimore, A7, S. Duquesne, Pa., UI, Munhall, Pa., UI, Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa. J2; McKeepport, Pa., UI, FI Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R5, S. Chicago, U1; Syracuse N. Y., CII; Watervliet, N. Y., A3; Waukegan, A5; Canton, O., T5, R3; Ft. Wayre, I4; Detroit, R5; Cary, UI.

Bire Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1, Ft. Wayne, J4; Harrison, N. J., D5; Baltimere, A7; Dunkirk, A5; Monessen, P1, Syacuse, C11; Bridgeville, UZ. Structurals. Baltimore, A7; A7; Massillon, O., R4; Chicago, Ill., J4; Watervliet, N, Y., A5; Syracuse, C11; S. Chicago, UL.

Plates Brackenridge Pa. A3; Chicago, Ul; Munhall, Pa. Ul; Midland, Pa. C11; New Castle, Ind., 12; Mid-lletown; A7; Washington, Pa., J2; Cleveland, Massillon, R3; Contentille, Pa., C15; Vandergritt, Pa., Ul; Gary, Ul.

Forging billets: Micland, Pa., Cl1; Baltimore, A2; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R5; Watersliet, A3; Pittsburgh, Chicago, U1; Syracuse, Cl1; Detroit, R5; Monhall, Pa., S. Chicago, U1. (Effective Feb. 3, 1958)



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The Brand New Type AL "Rapid-Blast" Cabinet is specifically designed for high rate of continuous automatic production. Also a complete line of rooms, machines and dust arresters. Over 60 years experience designing and building special equipment. Write for descriptive literature on MACLEOD Blast Cleaning Rooms, Cabinets, and Machines.



#### FERROALLOY PRICES

FERROALLOY PRICES		
Ferrochrome	Spiegeleisen Per gross ton, lump, f.o.b. Palmerton, Pa. Manganese Silleon 16 to 1996 576 max. \$100.50 19 to 2196 576 max. 102.50 21 to 2396 596 max. 105.00  Manganese Metal 2 in. x down, cents per pound of metal delivered. 25.5096 min. Mn. 0.256 max. C, 156 max. Si, 2.596 max. Fe. Carload, packed 45.75 Ton lots 47.25  Electrolytic Manganese F.o.b. Knoxyllie, Teon. freight allowed cent of Mississippi, f.o.b. Marietta, O, delivered cents per pound. Carloads 26.00 250 to 1999 in 1. 3.00 250 to 1999 in 1	Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lib. Carlonds
Per lb of metal 2" x D plate (4," thickt delivered packed, 99 km; min. Cr. (Metallic Base) Fe 0.20 max.	max. garleads, lump, bulk, delivered, per lb of contained Mn 25.50  Low-Carb Ferromanganese	per ib contained Ti \$1.35  Perrotitanium, 25% low carbon, 0,10% C max, f.o.b, Magara Falls, N. Y., and Bridgeville, Pa. freight allowed, ton lots, and the contained Ti.
Carbonds	Cents per pound Mn contained, lomp size, del'd Mn 85-90%.  Carlonds Ten Less 0.07% max C, 0.05% 1, 90% Mn 27.15 25.05 41.15 0.07% max C 35.10 27.30 29.10 0.10% max C 35.10 27.30 29.10 0.10% max C 35.00 36.10 37.50 0.35% max C 35.00 36.10 37.50 0.30% max C 35.00 36.10 25.00 0.55% max C 50.85% Mn 5.0-7.05 Si 28.60 31.40 32.60	Pa. freight allowed, ton lots, per lb contained Ti
Less ton lots	And divine the same active again	Molybdie oxide, briquets per ils
Calcium-Silicon Per Ib of alloy, hump, delivered, packed, 20-235; Cr. 60-255; Sl. 200 max. Fe. Carlonds 25, 65 Ton lots 27, 95 Less for lots 29, 45 Calcium-Manganese—Silicon Cents per Ib of alloy, hump, delivered, packed.	Silicomonganese Lump stre, cents per pound of metal, 85-38-8, Mn, 18-20% Sh, 15-56 max. C for 221 max. C, deduct 6.2c f.o.b. shipping point. Carloads bulk	contained Mo, fo.b. Langeloth, Pa
10-2003 Ca, 14-18cg Mn, 53-59cg Si   Carbands	Silvery Iron (electric furnace) Sl. 15,50 to 16,00 pet., f.o.b. Keokuk, Iowa, or Wenarchee, Wash, \$106,50 gross- ton, freight allowed to normal trade area, Sl. 15,01 to 15,50 pet, f.o.b. Niagara Falls, N. Y., \$23,00.	Vanadium exide, 86-89 © V <sub>2</sub> O <sub>2</sub> per pound contained V <sub>2</sub> O <sub>2</sub> . \$1.38  Zicconium, per ils of alloy contained v <sub>2</sub> O <sub>2</sub> . \$1.38  Zicconium, per ils of alloy contained various packed 27.25c  12-15 del'd lump, bulk-various services
Ton lots	Cents per pound contained Sf, lump size, delivered, packed.  Ton lots, Carloads, packed.  90.75 c; Si, 1.25 c; Fe. 24 c; Packed 22 0; 98 c; Sl, 0.75 c; Fe. 24 c; Packed 22 0; 98 c; Sl, 0.75 c; Fe. 24 c; Packed 22 0; Packed 23 0; Packed 25	Recostle   Part   Par
8. Duppussus 12.25 Add or substract 0.1c for each 1 pet Mn above or below base content. Briquets, delivered, 66 pet Mn: Carloads, bulk 14.80 Ten lots packed 17.20	Eastern zone, cents per pound of metal, delivered.  Cast Turnings Distilled Ton lots \$2.05	Less ton lots 1.57  Nickel-Boron, 15-18% B, 1.00% max Al, 1.50% max Sl, 0.50% max C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15
	(Effective Feb. 3, 1958)	

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	3 phase		cle	
	SL	P RING		
Qu. H.P.	Make	Type		Speed
2 1750	G.E.	M-579HS	4800	
1 1500	G.E.	MT	9.600	1187
1 1100	F.M.	OVZK. B		1800
1 800	G.E.	MT	2300	
1 700	A.C.		2300	
1 500	Whee.	CH.	550	359
1 400	Whse.	CH.	440	514
1 350	Cr. Wh.	Size 71	208.410	1.795
1 350	G.E.	IM-17A	\$40/2200	720
250	GE	MT-424Y	4000	
1 250	Cr. Wh.	Size 290	2300	350
1 250	Al Ch.		350	3500
1 200	GE.	IE33 B-M	220 440	
1 200	Cr Wh.	20QB	440	
1 200	G.E.	TM	440	433
3 200	G.E.	1-17AM	0.000	485
	G.E.	IM	2:2001	5.80
	nused Whae	CW	2306	433
1 125	A.C.		140	
1 125	ALCh.			
1 100	G.E.	IM-10	2200	
1 100	G.E.	IM	440	
4 100	A.C.	ANY	440	
3 400	SOUIF	REL CAG		
1 800	G.E.	KT-573		1180
1 650	G.E.	FT-559B	240	
3 500	Whise.	CS-1216		
2 450	Whee.	CS-1420	2300 415n	
2 450 1 400 1 300 1 300 1 200 2 200 1 150 7	G.E.	IK	2200	
1 300	Elliott	SC-BB D		
3 300	G.E.	KT 559A	2300	
1 200	G.E.	IK 17		580
2 200	G.E.	KT-557		1800
2 200				100 150
1 150/7		IK	440	880
1 150	Whise.	C88568	440	580
1 150	Whise.	HRONOUS		580
				0044
Qu. H.P.	Make	Type	Volts	RPM
1 7000	G.E.	ATI	2200 6680	600
1 4350	C. 11.		0 5900 138	
1 3500	GE		4800 2300	380
1 2850	Whse.		23(0) 4600	514
1 2800	Wise.	Sp.f	2300	720
1 2000	Mine.		2300	102
2 1750 1 735 1 450	G.E.	ATI	2300	3600
1 725	GE	ATI 2	200 12000	600
1 450	Whise		2200	128.5
3 325	GE	ATI	840	1800
1 905	G. F.	ATI	3.50	1800
1 100	G.E.	TS 7556	220 440	900

BELYEA COMPANY, Inc. 47 Howell Street, Jersey City 6, N. J. THE CLEARING HOUSE

# Chicago Encouraged By Mild Pickup

Used machinery dealers in Midwest welcomed a flurry of orders as January ended.

They're counting on a gradual upturn in business through the second quarter.

 The Midwest experienced a short-lived upsurge in used tool sales and even rebuild work during the first week of January. Sheet fabricating equipment, toolroom, and heavier equipment were caught up in a momentary surge, which dropped to virtually zero a short 7-10 days later.

The splurge was brief enough to leave the general tool inventory picture practically unchanged. Dealers who came out of December a little heavy on the inventory side are still in that condition. Dealers who were light on inventory are staying that way. However, it is possible at the moment to pick up used machine tools more easily than in early fourth quarter.

Averaging 15 Pct Off - Some tool dealers are running 25 pct off December sales. This is not an average, and the average for the entire area seems to be somewhat nearer 15 pct. December was not a good month.

As pointed out by the MDNA. used tool sales declined pretty steadily through 1957, and the Chicago area was no exception. It's true, a few used tool dealers and rebuilders in the Midwest had one of their best months in December. but this is far from a general rule.

Case Histories-However, dealers in the Midwest will bet that

1958 business levels will exceed 1957. Things have begun to look up in the last week or so.

For example, a specialist in flatrolled fabricating equipment reported the mild splurge in the beginning of January, followed by a sharp drop. This week, he's been hit with a surge of orders. Revising his forecast, he's now one of those who will bet 1958 sales will exceed 1957. He expects a gradual uptrend through the second quarter, a summer dropoff, followed by a sharp resurgence in the fourth quar-

A rebuilder limped out of December with a 30-day backlog or less. The spurt in the opening week of January boosted his business slightly. It then fell sharply. But now he's waiting for orders that will carry his order book up to 60 days backlog. He doesn't have the orders - not yet - but he counts them as good as in his pocket.

Pocket - Size Encouragement -The pickup is still confined pretty much to those dealers who have a long-term standing with individual customers. However, it is a pickup in their business, and at least 60 days before they'd expected any real change in the tempo.

It's important to note, also, that the present optimism includes both sellers of reconditioned used machine tools and rebuilders. Rebuild contracts are longer-term commitments. They generally mean that the customer has finally adjusted his own market sights, feels confident of the immediate business outlook, and is finally prepared to commit money over a fairly long period of time.

#### CONSIDER **EQUIPMENT** GOOD USED

SENDING ROLLS

10' x 10' Un. Bertsch Initial Type
10' x ½" King Fyramid Type
18' x 1 Nilos Pyramid Type

Cincinnati Gibert Model J.—15. Dia Spindle, 36Travei, 38° x 84° Table—New 1956
BRAKE—PRESS TYPE
10° x 9. A 12° x 9. Hydraulic—New
BUILDING 1.20° x 120° New Steel Frame—Unerceted
CRANES—OVERHEAD ELECTRIC TRAVELING
3 ton P&H
50° Span 125 Voit D. 0.
5 ton P&H
50° Span 125 Voit D. 0.
5 ton Cleveland
50° Span 125 Voit D. 0.
5 ton Shepart Ver

LECTRIC TRAVELING
56' Span 220,376 D.C.
56' Span 115 Voit D.C.
70' Span 115 Voit D.C.
70' Span 230 Voit D.C.
55' Span 220 Voit D.C.
55' Span 220 Voit D.C.
38' Span 440,376 D.C.
38' Span 440,376 D.C.
52' Span 230 Voit D.C.
52' Span 230 3.25 A.C.
77' Span 220 3.60 Cleveland Shepard Niles P&H Shepard Niles
Shaw
Shaw
Shaw
Shepard Niles
Shaw
Norther Northern P&H

120 ton PAH 50 Norm 220 3 to 0 A C. 120 ton Shepard Niles 77 Span 220 3 to 0 A C. 120 ton Shepard Niles 77 Span 220 3 to 0 Ton Norm 10 ton Capacity 77 2" Span—No Motors DRAW BENCHES Sonce Waterbury Parrel Single Draw 20 Ft. Length of Draw Standard Single Draw 44 Ft. Length of Draw

Confidential Certified Appraisals

Length of Draw
FORING MACHINES
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FURNACE—MELTING
15 ton Heroult Top Charge, 12" Shell Complete with

HAMMERS-BOARD DROP-STEAM DROP-STEAM FORGING 800 Jb 10 12 800

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#ZioC Manville Solid Die Single Stroke

#ZioC Manville Solid Die Single Stroke 

FESSES—HYDRAULIC
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500 ton HPM Fastraverse, Bed 36" x 36"
600 ton Elmes, 36" Stroke, 4 x x 45" Bet. Cols.
1300 ton Bliss 15" Stroke, Bed 49" x 48"
1300 ton Bliss 15" Stroke, Bed 49" x 48"
1300 tan Mesta Seean Hydr Forging Press
1300 Haldwin-Lima-Hamilton Hydr. Forging Press

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" 3 10" Schmitz Single Stand Two High
10" x 14" Single Stand Two High
12" x 12" Single Stand Two High
14" x 24" Single Stand Two High
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of Yoder, 2 Shaft 36 Bet Housings of Custom Built, 2 Shaft will take 36 wide and Custom Built, 1 Shaft x 14 3 16

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NO 4 Mesta RH LK, Capacity 2" x 12"
SHEAR—GATE igara Model 1212, NEW 1951

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SHEAR—ANGLE
0 1 0 1 2 Hilles & Jones

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4' arm 9" column Cincinnati Bickford super service radial Cincinnati 4 spindle upright drill, spindle

motor drive No. 151/2 Foote Burt vertical hydraulic feed driver for a multiple head (2)

" x 72" Landis type D heavy duty plain hydraulic cylindrical grinder

53" No. 24A Gardner vertical spindle horizon-tal disc grinder, 15 HP, multiple vee belt dr. 8" x 24" No. 35 Abrasive surface grinder

300 lb. No. 3C Chambersburg pneumatic forging hammer

28 Nazel forging hammer 4" bar Universal "Tri-Way" horizental boring milling and drilling machine

30" x 30" x 8" Cincinnati Hypro two rail, ene right hand side head, dial feed planer 600 ton No. 464 Toledo tierod frame knuckle joint caining press

400 ton Elmes cast steel high speed downward

acting hydraulic press 500 ton Baldwin Southwark high speed hydraulic vertical downward working press

800 tan Model 2E48-800 Hamilton straight side single crank air clutch press 750 ton No. 3 National all steel Maxipress

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20	*	NBP	71'10"	25'6"
20	*	NBP	71'10"	25'6"
150	**	Shepard Niles	100'	39"
40	***	Harnisfeger	98'10"	40'8"
20	*	Shepard Niles	98'10"	27'
20	*	Shaw	96'	27'
20	*	Shepard Niles	96'	28'
20	*	Shepard Niles	96'	26'
50	****	Shepard Niles	100'6"	25'
20	*	P&H	100'6"	24'9"

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CAPACITY	NAME	SPAN	LIFT
10	Niles	64'8"	23'
10	Shaw	64'8"	22'
10	NBP	52'	19"
10	P&H	52'	19"
75 t	Shaw	75'	36'

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14 x 36 centers LeBland Geared Head s.p.d.
14 x 36 centers Monarch motorized cone
14 x 36 centers Pratt & Whitney, cone
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14 x 36 centers Reed Prentice Geared Head, m.d., later
18 x 34 centers Hendey Yoke Head, m.d., taper
18 x 36 centers Hendey Yoke Head, m.d., taper
18 x 36 centers Hendey Foke Head, m.d.
18 x 30 centers Monarch Geared Head, m.d.
18 x 30 centers Monarch Medel CY Toolmakers, m.d. keller Attachment
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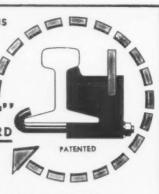
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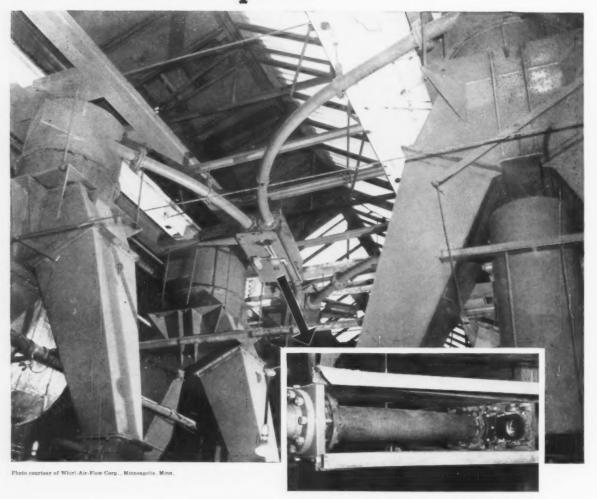
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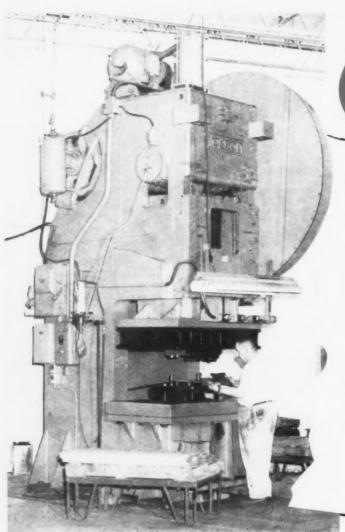
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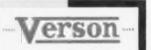
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